



Photo. Deek.

Survey of the Hills of the Ganges and the Jod.

Ormanahat, Bullocks not pure Burman.

MONOGRAPH
ON THE
CATTLE AND BUFFALOES
OF
BURMA.

BY
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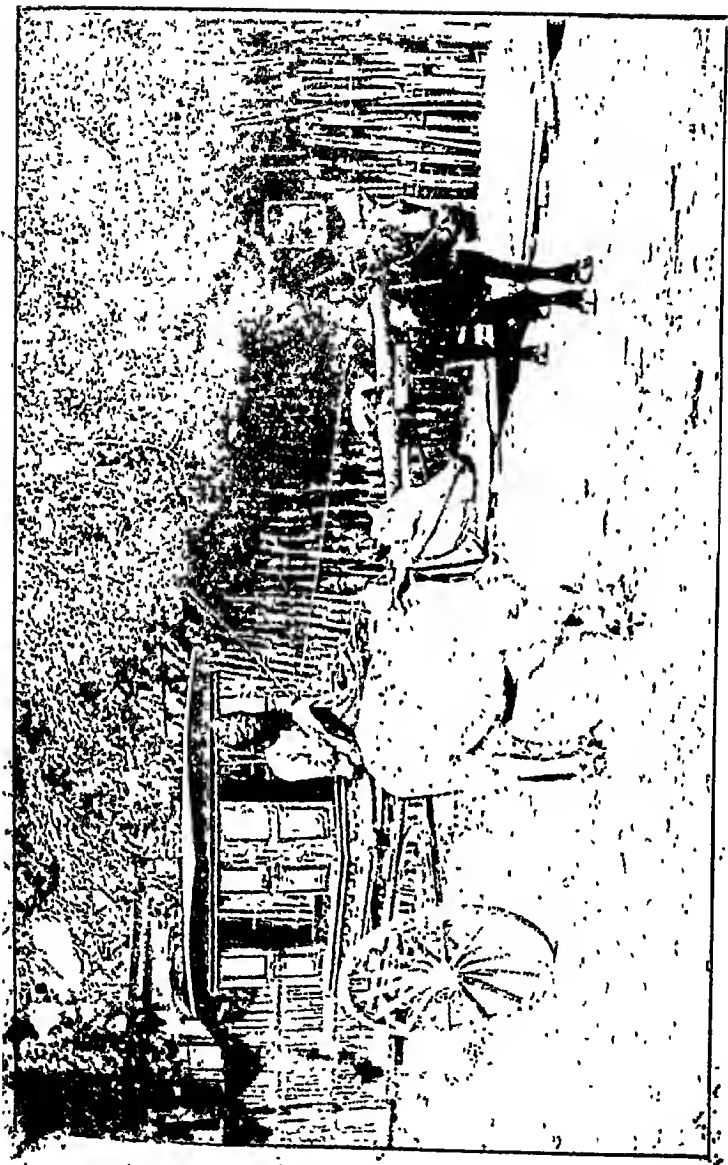
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Measurements of animals photographed are approximate only. They were taken in the field as carefully as is possible with restless animals.

Photos. 1 to 9 were taken by Tan Hye Chit, Photographer, Minbu.

Photos. 9 to 18 inclusive were taken by Messrs. Watts and Skeen, Rangoon.



110-100

TYPE OF INDIAN - CO. 101

Type of bullock (passenger) cart as employed privately and for hire in Mandalay.

INTRODUCTION.

THE tract of country comprising what is now known as the Province of Burma and including the Shan States covers an estimated area of 217,137 square miles, and presents throughout its extent many and diverse features of climate, soil, etc. In speaking of these various features this can be done more easily by dividing on broad lines the province into the present administrative portions, *viz.*, Lower and Upper Burma, and adjoining Shan States. As far as can be learned, *i.e.*, since the vast forests of Lower Burma have been cleared, Burma has always been, and still is, essentially an agricultural country, inasmuch as some 67 per cent. of the population of the whole province are engaged in agriculture, while the wealth of the greater portion of the remainder is derived directly or indirectly from this industry.

The country at the present time may be said to possess one indigenous breed of cattle and one of buffaloes, although many cattle-owners profess to be able to distinguish at all times between Burmese, Shan, and Siamese oxen. The differences, however, must be slight as correct judgment is frequently not arrived at, and would appear to be more directly the result of the young stock being reared under the varying conditions of these tracts and perhaps also the varying age at which emasculation is performed. This, however, will be mentioned later. Cattle of other breeds are comparatively few and due to importation from India. They, as well as their progeny, whether pure or cross-bred with the Burmese

cattle, are usually seen in the possession of natives of India. There are also some Indian buffaloes kept entirely for dairy purposes, usually met with in or about the larger towns where there is a demand for milk. I cannot remember having seen any crosses with the indigenous breed; Burmans do not appear to like them, and as for milking purposes the crosses would scarcely be likely to turn out an improvement, the native of India is unlikely to breed them.

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RANGOON;

15th November 1903.

MONOGRAPH

ON THE

CATTLE AND BUFFALOES.

OF

BURMA.

Chapter I.—DISTRICT WITH ITS PECULIARITIES, FODDER, WATER SUPPLY, &c., CATTLE MARKETS AND GENERAL CHARACTERISTICS.

LOWER BURMA.

THIS portion of the country embraces most of the delta districts of the Irrawaddy and Sittang rivers. The soil is for the most part an exceedingly rich alluvial, and those portions not under cultivation are covered with dense high jungle, or more or less impenetrable forest. The hill ranges except in Arakan and Tenasserim do not attain any very great height. The country is well watered, that is, it is intersected by large rivers and their tributaries. The rainfall here shows a littoral, sub-littoral, and inland zone. In the first named the average rainfall is very heavy, falling in the last mentioned, that is, the northern parts of the Irrawaddy and Sittang valleys, to a little less than 50". The wet season may be said to extend from the middle of May to roughly the middle of October, during which period the prevailing wind is from the south-west.

Owing to the general configuration of the country, which is very little above sea-level, the overflow of the swollen rivers and streams converts the whole expanse of country from the sea to the confines of the hills into practically a vast swamp or marsh. It follows that during this period there is anything but a scarcity of water; so much is this the case that in some of the delta districts it is difficult to obtain dry ground as standings for the herds.

 Peculiarities and General Characteristics.

At times in view of high floods the cattle may be kept on rising ground some little distance from the river bank, but a sudden rise often submerges this, and I have more than once accompanied Burmans in canoes in order to drive the cattle by swimming them to some other temporary refuge. Again, in some villages I have found owners who have taken the precaution to erect covered platforms above high water level, on which the cattle remain perched often for a considerable time, fodder having to be brought in boats from a distance. From this it will be readily understood that even many grazing grounds are submerged to the extent of several feet. This periodical inundation is often very trying to the cattle, but in some districts in order to bring land under cultivation, large bunds to keep the water in check have been constructed, and in these districts the cattle have to some extent been relieved.

Of the dry season, the hottest months are April and May when the temperature may range between 90° to 106° F. or even higher, inland stations being warmer than those on the coast. Towards the middle and end of this period, more especially when the early rain is scanty or wanting, or the monsoon is late, there is in some inland parts and in the vicinity of the coast a dearth of good water. In those places where there are perennial streams these are sometimes dammed. Nowadays, however, in addition to natural ponds, ~~lakes~~ (marages), etc., villagers are to some extent conserving water by digging tanks near their villages or grazing grounds. Tanks are also constructed for public use by certain charitable individuals. When these contain an inadequate supply, the animals, especially those about the estuaries of the great rivers, are forced to drink brackish water from tidal creeks.

As already noted, the soil is very rich, and natural pasture, as well as all kinds of vegetation, at least for the greater part of the year, is abundant. Even in the dry season, except when the early rains fail or the monsoon is very late, the country never presents the parched appearance of the dry zone or some parts of India I have seen. Fodder and grazing are therefore usually sufficient.



Photo-block.

Survey of India Office, Calcutta, 1904

Buffaloes ploughing paddy fields during rains.

Peculiarities and General Characteristics.

While cultivation is being carried on, or in the rainy season owing to tracts being submerged, many cattle are fed at home, the owners cutting and bringing in grass. Where this is possible the cattle are turned out on near grazing grounds, or grazed on the "Kazins" or paddy bunds, which are much wider than those in India. The cattle are then generally tended by children who keep them out of the crops. At the close of the harvest season the cattle are permitted to roam everywhere. The Burmese custom of reaping removes little of the culm, the cattle therefore obtaining the benefit of the stubble. In recent years the Burmans are appreciating the advantages of stacking some of their straw instead of firing it. During the season of carting paddy to steamers, railway-stations, etc., the cattle often receive some hand feeding in the shape of chopped paddy straw, or rice husk with a small amount of sessamum cake. Towards the end of February, when work is all finished, owners arrange to send their cattle to near or distant grazing grounds in charge of professional herdsmen till the early rains when they are required for ploughing. Early in March or end of February the grass tracts are usually fired, and as the soil generally retains some moisture which is aided by the heavy dews, a plentiful supply of grass soon springs up, which while young constitutes fair fodder. Moreover, there are low-lying tracts called "yos" and "kwins," which supply a large amount of good fodder, chiefly "hurriali" or "dhool" grass. (*Cynodon dactylon*.)

UPPER BURMA.

In a more marked degree than the lower division does Upper Burma show in its different parts variation in climate and physical features generally. Extending from the Arakan Yomas on the west to the Shan hills on the east, roughly from 20° to 22° of latitude, is a dry belt or zone in which the rainfall is moderate, often uncertain and scanty (frequently as low as $30''$). In this belt the country is more or less undulating with rising ground and low ranges of hills covered by scrub and thorn jungle and the soil is sandy to a great extent, with tracts here and there of black cotton

Peculiarities and General Characteristics.

soil. The atmosphere is dry and the temperature during certain months exceedingly high. Further north we find black cotton soil predominates, and the country is more or less hilly. The hills are forest-clad, and the climate is more humid, though cooler, the rainfall being a little less than that of parts of Lower Burma. The river is the Irrawaddy with its tributaries. The more important of these between Myitkyina and Minbu are, flowing in on the left bank, the Taiping, Shweli, Myitngè, and on the right, Mògaung, Kyaukwè, Mu, Chindwin, Mòn. The Chindwin is a very large river with several tributaries.

In a great portion of the dry belt away from the vicinity of large streams which contain some water during the whole year or distant from those tracts where irrigation is carried on, water is decidedly scarce, the supply usually being derived from deep wells, large tanks or sand holes dug in the dry beds of streams. The crops cultivated in these tracts are generally a little gram and wheat, sesamum, millet, maize, peas, cotton, and rice in such places as admit of its cultivation. In certain parts and at certain times cattle and men suffer very considerably from scarcity of water. I have experienced the difficulty myself often having had to procure it from a distance of several miles. In such cases the people manage to send carts with Pegu jars or other utensils for water, but the cattle have to be driven to and fro daily or they are kept in its vicinity. It is quite a sight in the middle of the hot season to see the cattle racing through clouds of dust to the river and plunging up to their girths. In a country such as this, forage depends entirely on some rain. Should it come, excellent and sweet pasturage springs up, but the cattle in these parts are naturally not fastidious, and are glad enough to browse on scrub and eat wild fruits. These means are supplemented when necessary by such artificial fodder as can be grown, and the conditions of pasturage, etc., are somewhat similar to those in Lower Burma. In the hill tracts grazing is usually plentiful, good grasses growing on hill sides, and the water from hill streams is generally abundant and good.



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Survey of India Office Calcutta 1904

Private travelling cart with pair of Indian bulls.

Peculiarities and General Characteristics.

SHAN STATES.

The Shan plateau is an enormous stretch of elevated tableland, lying for the most part between the Salween and Irrawaddy valleys, i.e., between 19° and 24° latitude, and 96° and 102° longitude. The average height of the plateau is between 2,000' and 3,000', but it is cut up by many mountain ranges between which the country is in the nature of rolling downs with here and there broad or narrow low-lying valleys.

In a southerly direction is a large undulating plain extending towards Mōngnai. In the valleys cultivation is carried on. The country for the most part is well watered by the tributaries of the larger streams which are numerous. The climate on these highlands varies considerably. From December to April it is cool, in some parts several degrees of frost being experienced. In the hot weather except in narrow and deep valleys the temperature does not exceed 90°F. The rains which occur between April and August are not continuous, and the rainfall varies according to the altitude or proximity of mountain ranges (from 60" to 100"). The country possesses excellent grazing tracts throughout its extent. The inhabitants are mainly agriculturists and rice, maize, buckwheat and beans are cultivated more or less for home consumption.

CATTLE MARKETS.

There are no annual cattle fairs such as I understand exist in many parts of India.

The Burmese as a general rule keep only sufficient oxen for their requirements, and when through loss or other cause they wish to replace any, they generally do so as opportunity offers, or through the medium of friends, or go to Upper Burma and select in the villages such cattle as they consider suitable for themselves and friends. There are also regular cattle dealers, Burmans and Shans, who buy cattle in the upper parts of the province, Shan States or Siamese Shan States, and march them or transport them by water

Peculiarities and General Characteristics.

to the delta districts or such places where there is a demand. Another means of buying and selling in some parts of Upper Burma is at the weekly bazaars when people from surrounding villages come in with all manner of produce, etc., for sale or barter. The trade in cattle for slaughter purposes is in the hands of Indians, chiefly Chittagonians.

In Burma, where a great deal of "cattle lifting" exists, it behoves all purchasers to be particularly careful as to whom they purchase from. Respectable cattle dealers therefore in order that their honesty be not questioned, endeavour when purchasing to do so before the headman of a village and also to obtain his signature as to the sale. If this were not done buyers would have some hesitation in purchasing cattle from them. Many years ago Government made an effort to safeguard the interests alike of buyer and seller by instituting cattle markets at many places in Lower Burma. These were opened or closed at discretion of the Commissioner of the Division. Each market was under a headman who was responsible to the Deputy Commissioner that a dealer selling cattle produced his cattle, and gave satisfactory evidence as to his identity, respectability, and his right to dispose of the cattle. A bargain having been arranged and fees paid, the description of cattle, etc., was registered, and a certificate with the Deputy Commissioner's seal and headman's signature was then granted to the purchaser. The purchaser and vendor had also to sign the counterfoil containing a description of the cattle. The markets have diminished in number. It can be readily realized, with a happy-go-lucky people like the Burmans, that the time and labour attending such formalities as well as the bringing of cattle to a market place, when with less trouble, though perhaps with some risk, the transaction might take place in their own villages, hardly tended to cause these to be taken advantage of to the extent hoped for. Stolen cattle, except with forged certificates, were necessarily precluded from such places, as also all individuals in any way connected with this nefarious occupation.



1 photo block.

Characteristic Breeds of Cattle.

Chapter II.—CHARACTERISTIC BREEDS OF CATTLE.

BURMAN BREED.

The Burmese oxen belong to the species zebu or humped cattle. They are of medium size, sturdy, active, clean-limbed and capable when called on to withstand hardships. They are uniformly good tempered, and generally speaking pleasing in appearance. More especially is this the case in that the Burmese as a nation being Buddhists, are from early childhood taught to treat with kindness all dumb creatures. These cattle are rarely excessively or unnecessarily worked, and are fed to the fullest extent of their owner's means. In fact they, like their owners, are fortunate in securing to a great extent exemption from excessive work or scarcity of food, the usual lot of those unfortunates both men and animals who have to work hard to live. The Burman as a rule never keeps an ox more than he can feed and look after properly, and houses his cattle as well as circumstances permit, washes and grooms them, and treats them generally as part of the household. I will go as far as to say that in no other Eastern country do cattle enjoy much better treatment or show, on the whole, better condition than those in this province. This fact, and the plump cheery appearance of the children, always attracts the attention of European visitors to the country.

The points taken in detail are—

Head—Shapely and well carried, broad between the eyes, forehead usually flat, often slightly concave, rarely convex.

Muzzle—Full and broad with large nostrils.

Horns—Are invariably very small, due to the habit of paring and cutting them. The usual method is, either to cut and pare with a *dah*, or by friction with a strip of green bamboo (*aner*). A piece of string is tied above and below the place where it is intended to remove the horn, the bamboo is then worked to and fro, very quickly as a rule. Two ideas are expressed with regard to this custom—(1) long horns are considered a nuisance, as likely to interfere with the high ornamental “*hays*” often employed on the

Characteristic Breeds of Cattle.

yoke, and (b) for appearance sake. The horns are round and are sprung well apart.

Ears—Are of moderate size, or small if compared with Indian breeds seen here, and are more or less erect.

Eyes—Dark in colour, mild in expression, but full and lively.

Neck—Is short, varyingly heavy in accordance with sex and period of emasculation.

Devlop—Moderate, extending from chin to sternum, but small compared with some of the Indian cattle.

Hump—Is not nearly as well developed as in many Indian breeds. In bulls it is from 6" to 7" in height, in bullocks 4" to 5½", and is but slightly marked in cows.

Back—Straight from shoulder to loins, or even to root of tail. The croup sometimes droops to a varying extent, though it is usually slight. The loins and back are wide, pelvis moderate, with the hind quarters showing considerable power.

Tail—Is set on usually a trifle below the line of the back. It is well formed, free from blomishes and is generally long and tapering, extending to a few inches below the hocks, and is invariably provided with a fine long and ample tuft of hair which at times reaches the ground.

Shoulders—Well sloped, lying well back over the ribs.

Forelegs—Short, shapely, with a well developed forearm ranging from 15" to 17". The joints are large, bone good.

Body—Chest is wide and deep and of good girth, ribs are broad, well sprung and deep. The barrel is round and substantial, the measurement exceeding the girth by some 10" or 12".

Hind Quarters—Fairly well packed, thighs are thick, broad and muscular.

Feet—Are of good size and shape, hard, the hoofs fairly close, generally dark coloured (horn green).

Skin—The skin is generally dark in colour of moderate thickness, plant and loose with abundant hair, which is soft and anything but what might be described as coarse.



Photo-blocks.

Survey of India Offices Calcutta 1903

Ordinary plough Ox (light chestnut).

Characteristic Breeds of Cattle.

Colour.—Without doubt the predominating colour of the Burmese breed is of varying shades of bay, generally called red. The hair on the dowlap, abdomen, inside of thighs, is of a much lighter tint than that of the upper parts of the body but blending softly and harmoniously. In these red cattle it is usual to find a lighter (whitish) patch running down each buttock and extending down the back and inside of the thighs, but not including the tail, a point in common with the wild cattle. The general colour often runs to a lighter shade from just above the knees and hocks to the hoofs, white stockings being sometimes met with. This lighter shade of colouring is often observed around the eyes, muffle, chin, jowl, and sometimes throat. In a great number of cattle a dorsal stripe is evident from hump to insertion of tail. Marled or broken colours though met with are infrequent.

In the higher hill ranges it would appear that black becomes the predominating colour.

Sheath.—This is a peculiar feature about the Burmese breed, inasmuch as it is exceedingly small and close with a tuft of hair at the orifice. Burmans are particular about this point. The very slightest tendency to a pendulous sheath is a certain indication of foreign blood.

Voice.—Is peculiar, quite unlike the bellow of house cattle; it is short, low, spasmodic, and something between a cough and guttural grunt.

Temper.—Very docile as regards handling and at work, bulls even being tolerant of Europeans and strangers. This is undoubtedly the result of kindness and general good treatment.

Cows.

Are altogether of smaller stature and lighter build. The head is small and finer, with small and often irregular horns, in fact in a large number the horns are just evident. The neck is light, the hump slight and dowlap small. The udder, when compared with that of the cows of milking breeds, is small and ill-developed, with teats not unlike those seen in wild cattle.

Characteristic Breeds of Cattle.

Bulls.

They are usually of medium size, active and compact animals. Hump is well developed and often shows a tendency to over-hang.

SHAN CATTLE.

Under this term is included those of the Shan States proper, Kachin Hills, and Siamese cattle.

The Shan and Kachin oxen are perhaps a trifle smaller than the average Burmese ox. Among the hill cattle we find more blacks and broken colours, with fewer red ones. These people frequently permit the horns to grow, which gives to the animals an appearance at first sight calculated to make people think they are of a different breed. Large numbers of Siamese cattle are brought across *via* Dagwin, Kawkaik, etc. They are rather smaller, very compact, fast, active, and in colour similar to the Burmese breed.

There is little doubt, I think, that the cattle of Burma, Shan States and North Siam are derived from a common stock. The Burmans have no special names that I can ascertain beyond that Shan and Siamese are designated Shans, and Kachin, Kachin or Shan, and I think that the name is applied only so long as they are known to have come from one of these places. Colour may help to establish a distinction, as a black ox with long horns is pretty certain to be described as Shan unless palpably of an outside breed. Any differences must be slight, and such variations as may be seen in individual animals are probably due to influence of locality, soil, pasturage, climate, kind of work, and such like modifying influences. Hill cattle, as a rule, are smaller and more active than those of the plains.

As to the origin of this breed, it is impossible to learn anything definite now-a-days. There is, however, a tradition to the effect that before the clearing of the vast forests of the low country for purposes of cultivation, no cattle, only buffaloes, existed. The cattle were a later importation from the upper provinces and the cis and trans-Salween States.



Survey of the Indian Census, 1944.

Shan Cow with Calf

Thetaw, 1944

PLATE VIII.



Photo-block

Survey of India Office, Calcutta, 1901

Burman Cows.

Types of horns usually met with among Shan Caravan Cattle. Rough drawings
kindly executed for me by Mr. T. Rennie, C.V.D.

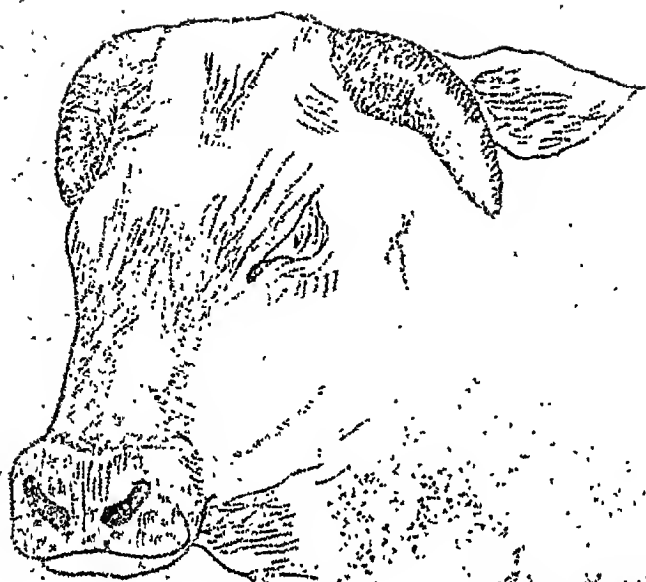


1. Horns 9½", fairly common type from Hsipaw, N. S. S.



II. A common type of horns in Shan Cattle. This is a common type of horns in Shan Cattle. This is a common type of horns in Shan Cattle. Ox from Hmawlaw. Horns 11" N. S. State.

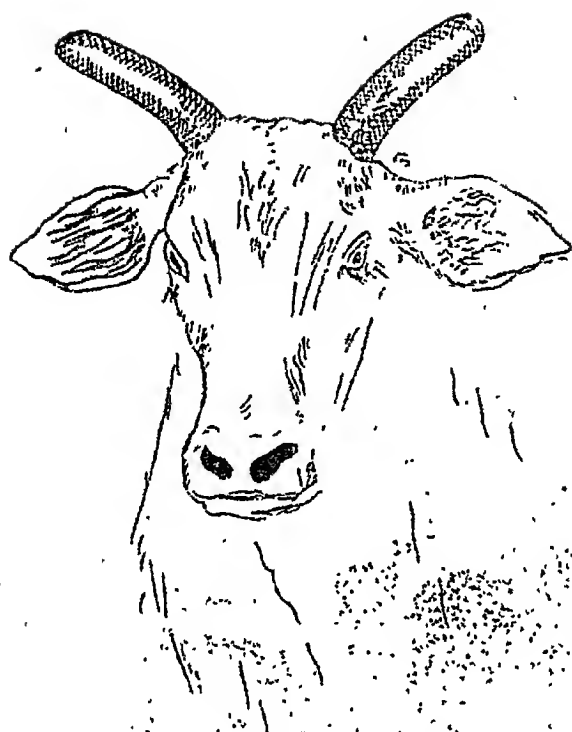




III. On free Hojas, R. S. S. - Hueso,



V. This ox is from Hmaling-yé. Probably a Chinese breed. Head short and broad, face dished (markedly). Length of face 15", breadth 8". Ears small placed high on the head and pendant. Height 48". Length from point shoulder to buttock was 47", Girth 63", Length of shank 7", Girth under knee 7". Weight about 650 lbs. Horns 3".



V. Gx from Hsiphw. 6" horns.



VI. Horns 14". Ox from H. S. S.



VII. Ox from Hmainaw: 7" horns.



VIII. Ox from Hsipaw, N. 45° - 14" horns.

Characteristic Breeds of Cattle.

MEASUREMENTS. No. 1.

	Weight.	Height.	Length of body.	Girth.	Shank.	Length of shank.	Length of horn.	Length of face.	Breadth of forehead.
Twenty-five oxen (selected) in the field.	lbs. *535	50"	73"	68"	7"	7"	6"	18"	8"
Twenty-five buffa- los (selected) in the field.	*933	53"	78"	75"	9"	8"	31"	20"	9"
Twenty-five oxen taken at random after slaughter.	...	49½"	69"	65"	6"	6½"	...	18½"	8"
Twenty-five buf- faloes taken at random after slaughter.	...	51"	76"	79"	9"	...	...	19½"	9"
Fifteen cows taken at random after slaughter.	...	41"	57½"	53½"	...	...	...	17"	7"

* Average of 100 taken in the field.

NOTE.—A good Burman working ox should measure roughly from 45" to 50" at the shoulder.

The distance from hump to insertion of tail 37" to 40"

The girth round the chest behind shoulder blade 56" to 70"

The circumference of forearm 16" to 17"

Shank 7½"

Characteristic Breeds of Cattle.

MEASUREMENTS. No. II.
SHAN OXEN AND BUFFALOES.

	Weight.	Height.	Length of body.	Girth.	Shank.	Length of shank.	Length of horn.	Length of face.	Breadth of forehead.
SHAN CATTLE.	lbs.								
Ten oxen (selected) in the field.	...	62"	55"	68"	6½"	8"	9½"	18"	8"
Ten caravan cattle (from Hsenwi and Hsipaw.)	...	47"	51"	63"	7"	8"	8"	18"	8"
Average of one hundred oxen in the field.	838	...	...	...	...	...	...	...	...
Average of twenty-five cows in the field.	409	...	...	...	...	...	...	...	...
Average of fifty buffaloes in the field.	642	...	...	...	...	...	...	...	...

* From point of shoulder to point of buttock.

Average of ten medium caravan cattle from Hsenwi and Hsipaw, N. S. S.—

Height, 46½", length of body from point shoulder to buttock, 51½", girth behind shoulder 68", length of shank 7½", girth of shank 7½", length of face 17½", breadth between eyes 7", length of horns 8½". Weight 675 lbs.

Average of ten selected oxen said to have been bred at Wetwin N.S.S.—

Height 52½", length of body as above 55½", girth 68½", length of shank 8", girth of shank 7½", length of face 18", breadth between eyes 8½", length of horns 9½".

Methods of Feeding.

Chapter III.—WORKING CAPABILITIES.

Oxen are employed for the following purposes :—

- (a) Ploughing.
- (b) Draught.
- (c) In oil and sugarcane crushing.
- (d) Dragging.
- (e) Packs.
- (f) Trotting and racing.
- (g) Rarely for raising water.

The special characteristics to be observed in selecting in addition to the points of an ordinary good ox for requirements under (a), (b), (c), (d), are, good or moderate weight, stout, short limbs with broad forearms and thighs, and feet sound with close claws. The yoke too must be good, *i.e.*, that the head and neck must be well set on and the latter powerful.

For pack purposes.—Medium-sized cattle, strong and active, back broad and straight with well sprung ribs and well, balanced frame, short clean limbs with sound hard claws.

For trotting and racing.—The animals for this purpose are generally light built with well knit frames and good muscular development, well coupled and with good deep chests. Heads well set on, lighter in the neck : the dewlap in such animals is generally moderate, and of course they are active and stand higher on the legs.

Chapter IV.—METHODS OF FEEDING

The food of cattle in Burma is, on the whole, *natural*, *i.e.*, they are driven out to grazing grounds, and select their own fodder. In the delta districts where a great expanse of country is under cultivation or even under water, owners at these times frequently provide grass and straw for their animals, feeding them at home.

Owners also allow their cattle to graze on the banks, when the work of the ploughing season is over or a little later : most owners hand over every animal that can be spared to professional herdsmen, who drive the cattle to such grazing grounds near or

 Methods of Feeding.

far, where fodder is abundant. The great fault of this system is that, generally speaking, the herdsmen undertake the charge of too many, and disease is thus often not noticed until a few deaths have occurred and the trouble becomes serious, as assistance is often hard to procure. The herdsmen are naturally well remunerated if the cattle are brought back in a satisfactory condition. They are paid in cash or kind, and the rates vary in different districts, but, generally, they receive five to ten baskets of* paddy per head. These herdsmen build sheds on the grounds for the oxen and themselves, and frequently take their families with them. The cattle remain out till the harvest, when they are required for carting sheaves to the threshing floors and after this to tread the corn from the ear. At this period there is abundance of grass about, and in addition excellent stubble. Later (in the cool season) they have to cart the corn in bags or bulk to steamers, railway stations or other places. Animals at work all day have fodder carried by the owners in the shape of straw, grass, etc., or the owners buy fodder for their oxen. In Upper Burma, if the crops from want of rain are a certain failure, the cattle are turned on to them.

Back bullocks have to take what they can get while on the march. In Lower Burma, some straw is stacked to supplement fodder, but in the dry zone where fodder is uncertain every stem of maize and millet, and even the pea husks, are saved. The maize, etc., is tied up into bundles and stacked on high strong frame-works so as to form shelter for the oxen. Some stacks may be seen 10 feet deep, while much fodder is stored in the same way in trees.

This fodder is used to supplement grazing, if scarce, and is also carried on journeys. It may be given whole, but is more frequently chopped into short lengths, sprinkled with water, and mixed with salt and oil-cake when procurable. The husk of the *pe-gyi* (large bean) is also mixed, and at times rice husk.

The tops of sugarcane are also given, and when a crop is unfit for sale or human consumption, the cane is split, chopped up and mixed.



Photo block.

Survey of India Office, Calcutta, 1904.

Burman bull, about 4 years old.

Castration.

Some Indians and nearly all Europeans who keep milch cattle feed them on oil-cake, waste gram, boiled broken rice, bran, etc.

In times when there is a great shortage of fodder, which happily in this country is of rare occurrence and then confined to limited areas, the cattle are disposed of at low prices and taken away, or are kept alive on anything and everything likely to maintain life.

Chapter V.—METHODS OF BREEDING GENERALLY.

Few bulls are really set apart entirely for breeding purposes. In fact many of the bulls one meets with are animals that are nice looking, probably have become pets, and thus escaped castration. There may be some few individuals who do select their stock-getters, but these are generally agriculturists in affluent circumstances, who keep a number of cattle and can afford to keep bulls for this purpose.

I have never heard of any one charging fees for the services of their bulls, at least not Burmans. I believe natives of India charge fees for the use of imported bulls which are patronized more or less by their own community.

As the cattle are permitted to mix freely and animals generally are not emasculated at an early age, the young herd bulls naturally are the stock-getters. It is a matter of natural selection.

Chapter VI.—METHODS OF REARING YOUNG STOCK.

This is by nature's method. Milk and its products are not employed for any purpose by the people. The calves therefore obtain the full benefit of the whole of their natural nourishment and are virtually permitted to suckle till rejected.

Chapter VII.—CASTRATION.

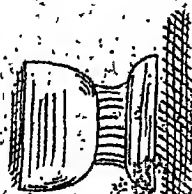
In this country emasculation is resorted to usually when animals have more or less attained maturity, that is, between three and four years of age. To carry out the operation one of three methods is generally adopted.

Castration.

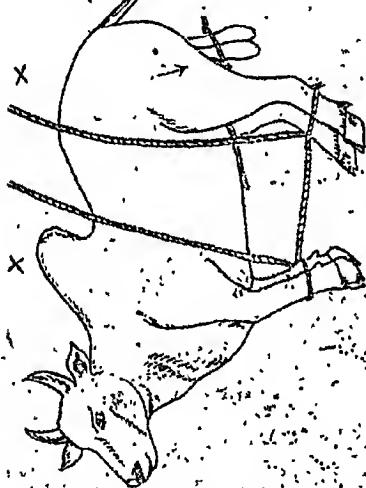
(1) The animal having been cast and securely tied with ropes, the neck of the scrotum is grasped with the hand and the testicles are given a few sharp blows with a flat smooth piece of wood (a piece of the branch of a palm is often employed for this purpose) or a soda water bottle to thoroughly bruise them, after which the animal is untied and allowed to rise.

(2) This is a slight modification of the above. A piece of split bamboo is employed as a clamp to grasp the neck of the scrotum, the testicles being then bruised and kneaded into a pulp with the hands. When this is sufficiently done, the clamp is removed and the animal is allowed to rise. There are in some places other trifling modifications in procedure, such as bruising the cords above the glands, causing the latter to atrophy. In this method the instruments used are clamps, hammer and a blunt-edged flat chisel, all made of hard wood. The clamps are fixed high up, and the cord then bruised by pressing it between the edge of the chisel and clamps and tapping the chisel smartly, at the same time working it round the cord.

(3) *Excision*.—In this, the more surgical method, the scrotum is opened with a knife, the spermatic artery ligatured, and the testicles removed. This operation however is not often resorted to, blood-letting not being much approved of; but the real truth perhaps is that subsequent attention and care are necessary, as a certain amount of inflammation necessarily follows these operations. The only medicine employed to allay it is a mixture of gingelly oil (*sesamum indicum*) and turmeric. In some parts soot is added. This mixture is simply smeared over the swollen scrotum. The same mixture is also employed by the Shans. When swelling is very great, they sometimes apply hot or cold applications, usually the latter. The operation of crushing the testicles, though rude and unscientific, is very free from evil results, and when it is taken into consideration what might happen to animals going about with open wounds, I think it may perhaps after all be the more humane system. Some cultivators and cattle owners employ professional operators to carry out the castration of their stock, and these, as



Offering to Nats, the
Kadaw-Pre.



Drawing of a bull cast
for castration.



The operator with chisel
and hammer.

Rough representation of castration by a Larmon (not an Artist).

On the left is the "Kadaw pwe" or offering to Nats.

In the center, the bull cast for operation, and on the right the operator armed with wooden chisel and hammer.

Castration.

remuneration for their trouble, receive a fee of one rupee, or four annas with one "pyee," i.e., $\frac{1}{16}$ th part of a basket of rice or about 3 lbs. for every operation. The people entertain strong and decided opinions on the prejudicial effects of early castration. So well do they know this, that they can with a fair degree of nicety tell when to carry out the operation with the least possible evil results. The effects of early castration are a general weakening of the frame, the animal becomes leggy, and the neck does not attain its natural size. The colour, instead of becoming rich on approaching maturity, remains light or washy. Though in many instances the generative sexual impulse may not be entirely obliterated, yet the operation is sufficiently complete to effectually render the animal useless for breeding purposes. The operation is usually carried out between the ages of three and five years. When delayed too long, it renders the animal listless and lazy, the result being that he becomes too fat to make a good working ox. With a great many operators propitiation of the Nats (spirit) is a necessary part of the performance. The operator is careful about this. The "Kadaupwe," an offering to Nats, is placed on the ground just in front of the animal. It consists of two combs of plantain fruit, some leaves of the betel vine, areca nuts, with a little lime, tobacco, and a cocoanut fruit, placed carefully in a "Dawngnan" (wooden tray). The operator, after placing his instruments on the tray, raises it high above his head and waves it right and left saying, "Ye Nats, I pray you let the operation which I am about to do prove successful, let the animal be preserved from fatal consequences, and let him speedily recover from the effects of the operation, etc."

After the operation is finished the operator carries the offering to his house, care being taken before leaving to see that the fee Rs. 1 is placed, together with the other things in the tray. When he gets home he places the instruments above the cooking place. Should the instruments be placed elsewhere evil consequences to the animal lately operated on might ensue.

 Bullocks, their Capabilities of Work.

Chapter VIII.—MILKING CAPABILITIES.

It is natural in stock of this kind, in which milking capabilities are not carefully fostered by means of selection, etc., to find that the cows yield but a small quantity of milk. This, like that of a wild animal is, in a way, ample and rich, *i.e.*, it is suited to the requirements of the offspring. Even cows in good condition and full flow of milk will not yield more than an average of about two so-called quart bottles per diem, if as much, or this amount in addition to what the calf may take when suckling for a few minutes in order to stimulate the flow of milk.

Chapter IX.—BULLOCKS, THEIR CAPABILITIES OF WORK.

A Burman rarely exacts the maximum of work from his animals, and it must be some very necessary circumstance which causes him to do so. This probably is due in a great measure to his religious scruples as well as his desire to do as little work as he can.

As regards the former, quoting from Nisbet, "The fear of becoming an ox or an ass in the next state of existence leads him to be devout and attentive to religious ceremonies, and to make merit for himself even though he may thereby leave his family penniless. That it should lead him to be patient with and kind to such animals, as well as to vipers, mosquitoes, and all other noxious creatures, necessarily follows as a corollary. Otherwise might he not perhaps be beating or abusing the incarnation of his father or his mother, if their merit (*Kutho*) had not been in excess of their demerit (*Akuthala*)? From this teaching it therefore follows that all the lower orders of animals differ from man only in condition and not in nature, for they are the temporary abodes of souls of human beings who are undergoing punishment on account of having had a debit balance to their life account, and who were consequently compelled to descend in the scale of beings in place of ascending to become *Nat* or *Brahma* in the twenty-six celestial regions." Chudama himself recounted that owing to demerit during a past existence as a man, he passed through several existences in



Photo. 111111

Showing harrow with bullock's.

 Bullocks, their Capabilities of Work.

the embodiment of animals. For the above reasons a Burman objects to taking any life, as he may be destroying the incarnation of a relative or friend.

The Burman compassion towards animals is also fittingly described by Fielding in "The Soul of a People," 2nd Edition, chapter 20. He observes: "The Burman's motto should be *Noblesse oblige*, he knows the meaning if he knows not the words. For the Burman's compassion towards animals goes very much farther than a reluctance to kill them. Although he has no command on the subject, it seems to him quite as important to treat animals well during their lives as to refrain from taking those lives. His refusal to take life he shares with the Hindu; his perpetual care and tenderness to all living creatures is all his own.....The Burman is full of the greatest sympathy towards animals of all kinds, of the greatest understanding of their ways, of the most humourously good-natured attitude towards them. Looking at them from his manhood, he has no contempt for them, but the gentle toleration of a father to very little children who are stupid and troublesome often, but, are very lovable. He feels himself so far above them that he can condescend towards and forbear with them."

The natives of India have not been slow in taking advantage of this trait in the Burmese character, for it is not uncommon to find them at railway stations and about pagodas with baskets containing recently captured finches, such as amadavats, weaver birds, etc., and also pond herons, which well disposed Burmans buy in order to set free. Unfortunately in Upper Burma the poorer class of Burman is now inclined to trade in such birds as snared or netted snipe, teal, partridge, etc. However, it is easy to shame them into setting the birds free. A short time ago in Mandalay a Burmese woman brought round some snipe for sale. I bought a few, paid her what she asked, and then set the birds free. She was much upset by this, imploring me to take back the money which I refused to do. I went upstairs and watched her. When she got clear of the compound she set the remaining birds

Bullocks, their Capabilities of Work.

free. Of course there are bad people everywhere, and in Burma fishermen, etc., will have much to answer for hereafter. Still those who are in a position to do so will avoid ill-treating in any way a dumb creature.

It is well known, however, that Burmans are very omnivorous as regards diet, fish, flesh, and fowl being equally acceptable, but as he does not kill them the demerit connected with their death cannot be chargeable to the debit side of his life account, so he gets the benefit at the expense of the destroyer.

If one desires to travel during the day with carts, the cartmen generally object, pleading, as a rule, that it is a hardship on their oxen. In the same way when ploughing they do so during the hours when the heat is not great; also when doing journeys to the jungle, distant villages or other private business, they will invariably travel by easy stages and then only during the cooler hours of morning and evening or at night. Burmans with their carts moderately loaded will travel from 4 P.M. till 8 A.M., halting for an hour or two at midnight to water and rest the oxen, the distance covered naturally depending on the track, good or bad, and sandy or otherwise.

Many divide their journey, that is, they leave camp, between 2 A.M. and 4 A.M. and travel till 8 A.M., rest for the day and resume the journey at 3-30 or 4 o'clock P.M. In this manner distances from 15 to 24 miles may be done in the 24 hours without any fatigue to the oxen. As a Burman always travels in comfort with bedding, food, etc., and time being no particular object, he prefers easy stages to long ones.

Bullock carts vary immensely in size, pattern and weight. Many of those in Upper Burma have solid wooden wheels, especially in the sandy tracts, where they have a clever contrivance (bamboo bush) in the nave to avoid sand causing friction. Of recent years wheels of European pattern with iron tyres, etc., are becoming fashionable. Twenty-five bushels of paddy is considered to be a full cart load and the official basket is 46 lbs., i.e., 1,150 lbs.

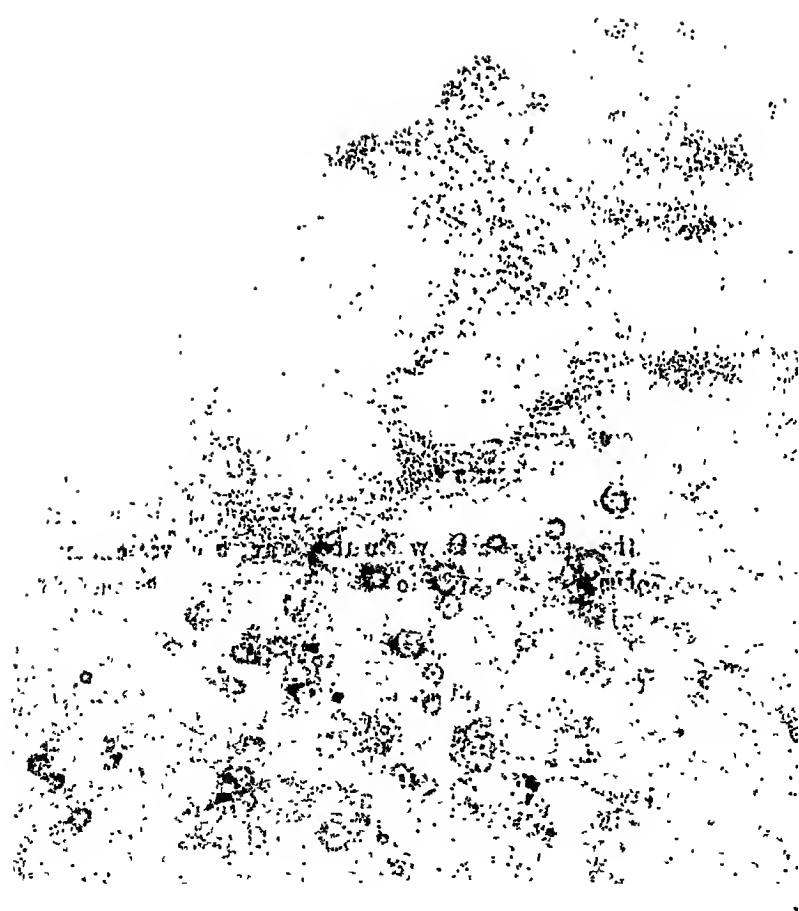




Photo-block

Survey of India Office, Calcutta, 1904

Pair of Draught-Oxen.

Prevailing Prices.

There is no fixed standard by which the amount of work can be estimated, as so much depends on the discretion of the owner, and the kind of load varies so, green bamboos, house posts, grain straw, etc. The cartmen, however, know the track to be traversed (made roads being very few and far between) and the capacity for work of their oxen, and each before starting will be observed to go to the yoke and from experience by raising and lowering it they can gauge the weights whether great or little, and balanced or otherwise.

The amount of ploughing allotted for a pair of bullocks for the season is more or less ten acres of ordinary paddy land. This only constitutes hard work if it has to be accomplished in a short time, especially in the dry zone. In some places oxen are frequently employed to drag to the carting station timber from the forests. For this purpose the men combine and employ their oxen in spans, which are regulated as to the number of oxen as they go along by the nature of the ground to be traversed.

Oxen and sometimes buffaloes are employed in oil and sugar-cane presses where they work under cover for the greater part of the day.

It is quite exceptional for cows to be placed under the yoke either in carting or ploughing. They are kept for breeding and are more or less herded. A very large number are not even provided with a nose rope and are what are termed "*ayna*," wild, not handled. In the evening they are driven in and penned within or without the village.

Chapter X.—PREVAILING PRICES.

Prices ordinarily vary in parts of the province and may be influenced by circumstances, such as scarcity of fodder, disease, removing a large number of cattle, a bumper crop with good rice market, when money is plentiful.

Ordinary prices in Upper Burma range from Rs. 70 to Rs. 150 per pair, the former price being for light and under-grown cattle used generally for light ploughing in sandy soil. For the

Wild Cattle.

latter, good ordinary working oxen can generally be obtained, still for extra quality, prices will run up to Rs. 300 a pair. Cows sell from Rs. 30 to Rs. 60.

Shan States.—Cattle are slightly cheaper.

In Lower Burma the average price is much higher, prices running from Rs. 120 to Rs. 300 for cattle suited to heavy draught work. In very exceptional cases, as with horses, owners ask astounding prices, and I suppose can get them especially for handsome racing cattle.

NOTE.—Arakan, although a division of the Province, is not even now considered by Burmese to be a part of Burma. The people are known to Burmese as Rakaing, and the language is greatly different. There are also a large number of Chittagongians. Many of the cattle are imported from Lower and Upper Burma by way of the Aeng and other passes through the Arakan hills, as well as from the Chittagong side. There are thus two distinct breeds with their crosses, those from Chittagong being more akin to the smaller Bengali cattle. Sometimes buffaloes are exported from Sandoway to Bassein. In the island of Cheduba the cattle are fine.

As regards prices, imports from Burma are said to bring Rs. 90—100, and those of the country an average of Rs. 30—40.

Chapter XI.—WILD CATTLE.

Of the bibovine group there are three species in Burma, viz.—the gaur, *pyawng* (*Bos gaurus*, or Bison of Indian sportsmen), the banteng, *tsawng* (*Bos sondaicus*), and the gayal, *mythun*, *sha*, or *shio*, of the Chins and Kukis (*Bos frontalis*). These animals are large, and in all the spines of the anterior dorsal vertebrae rise to a considerable height causing a prominent dorsal ridge. The forehead is more or less concave. The lower parts of the legs from just above the hocks and knees are a dirty white; the hoofs, for the size of these creatures, are small, neat in shape, and pointed.

The horns are generally of a yellowish colour for an inch or so at the base, then greenish, and black towards the tips.

Bos GAURUS.

Of the three species *B. gaurus* is the largest, standing about 16 or 17 and rarely 18 hands at the shoulder. The wither is very high.

Wild Cattle.

Head—Rather short and massive. A most prominent feature is the marked convex intercornual frontal crest arching forwards, thereby imparting a marked concavity in profile.

Horns.—The horns are usually flattened, transversely ridged in front for some distance up, and the tips are often frayed. They run outwards, are directed upwards but not backwards, and occupy the vertex of the skull. In cows the ridge is not so well marked, the horns are much thinner, not so long, and are more upright and curved slightly inwards.

Eyes—Large and full with bluish coloured pupils.

Ears—Are medium and more or less erect.

Neck—Short, heavy massive and with no dewlap.

Tail—Short, with a good tuft of hair.

Colour—A deep chestnut or brown, which in bulls is much darker and in the jungle makes them appear blackish. The cows are lighter in colour, more or less inclining to rufous. Inside of forearms and thighs, lighter in tint. From the nape to just about the eyes is an ashy grey or dirty white. On the under surface of the throat and neck and even along the abdomen there is a good deal of long coarse scattered hair.

Gaur are distributed in suitable localities throughout the province. They prefer hilly country but are often met with on the flat. They roam about in herds, never far from cover, and are always extremely shy and easily startled. I believe they have never been domesticated. In fact, calves are most difficult to keep alive after capture.

BOS SONDAICUS.

This is a handsome race of cattle.

Head—Well shaped, not so heavy in appearance as the gaur, more elongate, the forehead not concave, the skin on frontal ridge (which is not so marked in gaur) is more or less raised, thick and horny, and is greyish or yellowish white in colour. In young bulls the horns are cylindrical, in old ones flattened about the base and ridged. They are directed generally outwards and upwards, then slightly

Wild Cattle.

backwards and inclining inwards towards the tips. In cows the horns are lighter and smaller, some are more or less lyrate in shape, while others are directed upwards, slightly outwards and inwards.

Neck.—Is of medium length, heavy, with a moderate dewlap. The dorsal ridge is not as well developed as in the gaur. The eyes and ears are as in the gaur, but the tail is, I think, slightly longer.

Height.—Roughly $15\frac{1}{2}$ to even $16\frac{1}{2}$ hands.

Colour.—Young bulls and cows are of a bright brown or chestnut colour, similar to many of the red cattle here. Old bulls look blackish. In both sexes a white patch is present on the buttocks, extending to, but not including, the tail, and running down inside of thighs. The lips, around muffle, and inside of the ears are whitish, and the colour round eyes as also dewlap is usually of a lighter tint than the body colour. A slight dorsal stripe may be evident; it is so in calves, and the colour in them is uniform, i.e., the white patch on hind limbs is wanting.

These cattle appear to be longer limbed than gaur; and prefer lighter jungle, though not averse to heavy cover. They are ordinarily more often found on flat or only slightly hilly country. They are not domesticated in Burma. I believe a Burman at the village of Paya-Thonzu in the Pegu District some years ago had a pair of tsaing which, I am told, were so tame that he could drive them in a cart.

They go about in herds; I have seen as many as thirty in a glade. They are usually extremely wary, and in my experience compared with gaur, more inclined to show fight when wounded.

BOS FRONTALIS.

Horns shorter, forehead flat, the frontal ridge between horns generally straight, but I have seen skulls showing a slight arch.

The horns are not so massive, yet some are of moderate length and girth, are very slightly curved and spread outwards and slightly upwards but not inwards.

Neck.—Broad heavy with a pronounced dewlap. The dorsal ridge is evident but not so developed as in the gaur.

Wild Cattle.

Tail.—The tail is moderately long. With the exception of points noted and the fact that they are shorter on the legs, they resemble the gaur. In colour they distinctly do, but in some tame individuals a tendency to broken colours is noticeable. So far, on the authority of Blandford, a wild mythun was killed in Tenasserim, but the real habitat is up to date a mystery.* It is strange that this animal is found in a domestic state in possession of the Indo-Chinese tribes extending from the Chittagong Hill Tracts to the hills bordering on the Upper Chindwin Valley, and also through the hills as far as the Arakan Hill Tracts in Akyab District. Many of these animals are quite tame, so much so that at Haka I have seen a few milked. The tame ones are herded near villages or penned within them, but there are several semi-wild herds from which if an animal is required it has to be shot. Amongst our frontier tribes they are not used for agricultural purposes, but play an important part in the price paid for a wife, also in sacrifices and feasts. They are considered, and justly so, to be an indication of the wealth of their owner. Chins when buying or selling do not take into account the age, size, etc., one measurement only being taken, viz., the length of the horns.

When a mythun is to be sacrificed, he is tied up and kept without food and drink for two or three days, the idea being that this makes the flesh sweet and tender, an important matter when flesh is eaten immediately after death.

* Since writing the above I have read an excellent article entitled "The Gaur and the Gayal," from the pen of Mr. E. C. Stuart Baker, F.Z.S., published in the Journal of the Bombay Natural History Society, Vol. XV, No. 2, page 397. Mr. Baker had unique opportunities for studying both animals having lived many years in North Cachar in the heart of the domesticated Gayal country. He expresses his opinion as follows:

"During the last thirteen years I have been collecting a large mass of material with a view to trying to prove either that the gaur and the gayal are one and the same, or else that they are specifically distinct from one another. During the first two or three years of this period I held the opinion that they were identical. After this I veered round a good deal, and began to think that the reasons for considering them to be distinct might be right; this, because I quite failed to obtain certain necessary links between the two forms. The years 1897 to 1899, however, produced specimens which have shown every one of those same links, and I am now forced to the conclusion that there is no difference of specific value between the two animals, such differences as do exist being principally, if not entirely, the result of domestication."

Wild Cattle.

MEASUREMENTS.

Sex.	Height.	Length of body.	Girth.	Shank, under knee.	Length of shank	Length of horn.	Length of face.	Breadth of forehead.
<i>Bos sondaicus.</i>								
Bull ..	64½"	85"	83"	7½"	...	23½"	21"	9½"
Cow ..	61"	76"	74"	7"	...	12½"	20½"	8"
<i>Bos frontalis.</i>								
Bull ..	55"	89"	82"	8½"	...	16"	20½"	8½"
Cow ..	50"	75"	74"	...	...	11½"	20"	...
<i>Bos gaurus.</i>								
Bull ..	70"	104"	100"	10"	...	73"	23½"	9½"
Cow ..	69"	88"	88"	9½"	...	21"	22"	...
<i>Bos bubalus (wild buffalo.)</i>								
Bull ..	56"	106"	98"	...	...	39½"	23"	9"
Cow ..	...	...	...	...	...	...	...	...

With regard to method of killing, what I saw was most sickening and forced me to leave promptly.

The mythan has his two fore and two hind legs tied together and the free ends of the ropes secured to a stake in front and behind. The man who performs the deed does so with a sharpened bamboo or a spear which he thrusts in between the ribs in the region of the heart and proceeds to stir it about while the poor beast plunges, thus evidently affording amusement to the crowd of savage onlookers.

Prices vary from about Rs. 120 to Rs. 160.

Note.—In certain parts of the province, there are some so-called wild cattle: though very ferocious and to all intents and purposes wild, they are simply tame ones that have run wild. They breed amongst themselves, and the bulls perhaps cover some cows from villages in the jungle. These animals do not in appearance differ from ordinary cattle. Broken colours are infrequent among them.

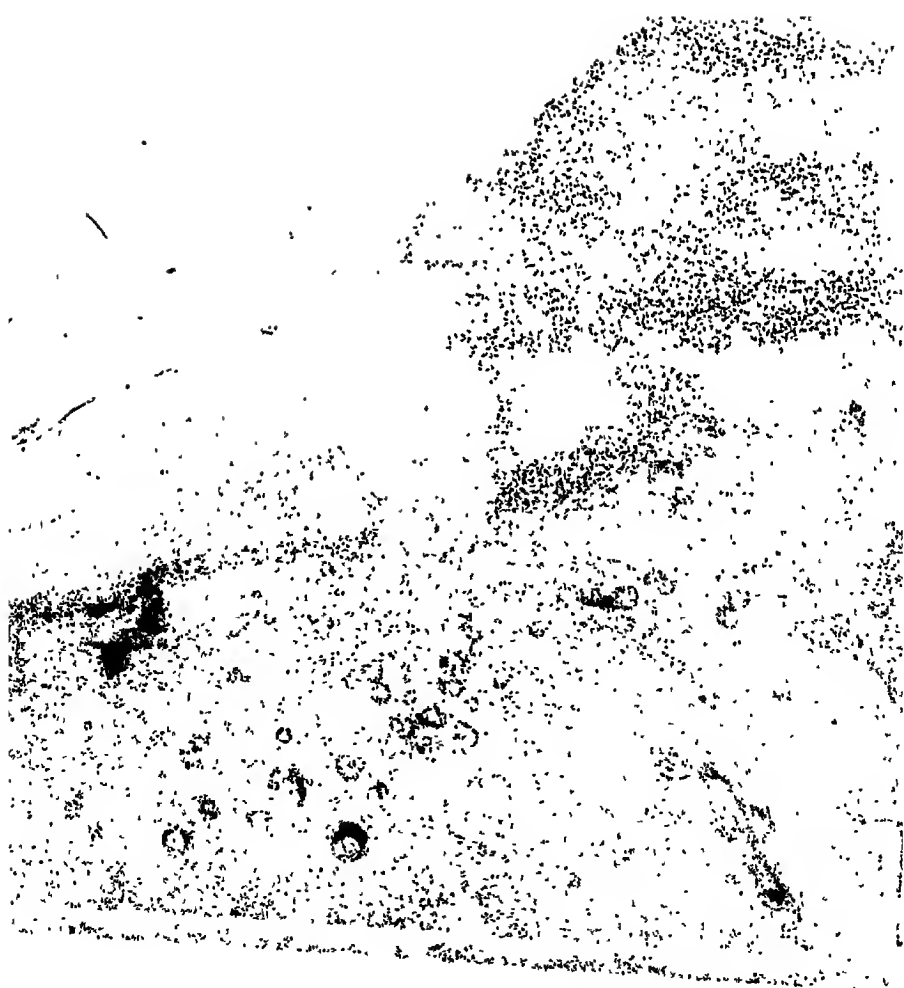


PLATE I.



Photo block

Survey of India's Office, Calcutta, 1900.

Pair of Bull Buffaloes.

Buffaloes.

Chapter XII.—BUFFALOES.

The buffaloes are characterized by their more or less flattened angulated horns which are trigonal on section, thus differing from those of the gaur, tsaing, and mythun. They are set on below the occipital plane or vertex of the skull. The general form is heavy, legs stout, short, with broad large hoofs or claws.

THE BURMESE BUFFALO.

Head.—Moderate in proportion to size; in some it might be described as small. The face is long and rather narrow, the forehead slightly convex or rounded, there is a slight concavity between the orbits; the muzzle is large, square, and black.

Horns.—Vary in length, thickness, and curvature, the majority are crescentic, being directed outwards, backwards, upwards and towards the tips, inwards. The anterior and posterior surfaces are flat, and transversely ridged for a considerable distance from base imparting a rugged appearance supposed to be indicative of age. In colour black throughout. In those animals with long horns when the nose is raised they lie along the sides of the back. In cows the horns are generally thinner, longer, more outwardly directed and straighter, some attaining a length of 70". I have seen one 7' between tips of horns and a friend saw another in Minbu district about the same.

Ears.—Are not very large and are not fringed though there may be longish hair growing from inside.

Eyes.—Moderate in size and dark in colour.

Neck.—Varying according to sex and time of emaciation, but in bulls short, most massive, and thick on crest.

Back.—Generally there is a distinct rise in the region of the shoulders and again in the lumbo-sacral region, but the croup droops markedly.

Forelegs.—Strong and short with a tuft of more or less curly hair on the knees.

 Buffaloes.

Hind legs.—Thighs fair, but the short croup may lead one to think that there is weakness where none exists.

Tail.—Moderate, but varying in length: it is set on rather low.

Sheath.—Small, slightly pendulous near orifice, somewhat resembling a teat in shape.

Scrotum.—Small, usually of a pinkish or light flesh colour, as are also the udder and teats of females.

Skin.—Generally black and moderately thick. The coat in adults is thin, the hair longish and wiry but scanty or more or less wanting in old animals. In the young there is an ample coat of darkish brown hair. In the light or dun coloured specimens the skin is wanting in pigment.

Temper.—In the hands of their owners they appear very gentle and docile. They are easily excited especially by unusual objects, such as the presence of an European, more so if he is mounted. They are suspicious of, and inclined to be nasty to, strangers, and should be approached with the greatest circumspection, care being taken that a road for retreat is clear. It is strange, however, that almost any Burman, man or small boy, can turn them away.

Voice.—A plaintive squeak.

Colour.—Black is general, there are some dun specimens, and as in the gaur, etc., many have white stockings. Many also have a white fringe to muzzle also a white crescentic band where throat joins chest, as well as frequently a like band on upper part of throat behind lower jaw.

Characteristics for work.—They are employed in ploughing, dragging, and by Talaiugs and Karens for carting. They are not selected for any particular work beyond that those working timber like heavy animals with good necks, good barrel, and stout limbs. For ploughing any size is suitable as the ploughs are not heavy.*

Methods of feeding.—They are usually grazed as is the case with oxen, only it is on ground marshy and in the vicinity of water.

* The Burman states a single buffalo is used in the plough.

PLATE II.



Photo-black.

Survey of India : Office, Calcutta, 1901.

Buffalo Bull.

Buffaloes.

The hand feeding is practically *nil*. When any is given it is similar to that given to oxen.

Methods of breeding, etc.—The same remarks apply as are noted under cattle. The cows generally drop the first calf when they are about 4 to 4½ years.

Methods of rearing young stock.—The calves are suckled and not weaned.

Castration.—The operation is carried out generally between ages of 4 and 5 and is performed in manner already described under cattle, the usual time of the year being in the cool weather between November and February.

Cow-milking capabilities.—These, like the Burman cows, are small milkers and are not much used for this purpose. They yield roughly from two to four bottles.

Capacity for work.—These animals being by nature nocturnal, and when possible spending the heat of the day in swamps, or lying up in cover, are intolerant of the sun and are therefore worked for short periods in the cool hours, morning and evening. As to comparison with oxen of the amount of work that can be exacted from these animals, enquiries elicit nothing definite, as an individual entertains his own ideas which are regulated by his own desire for work, etc., or otherwise, but on one point the people are unanimous, *viz.*, that on marshy, heavy, clays, etc., buffaloes are in every way superior.

Prevailing prices.—Prices in Lower Burma vary from Rs. 40 to Rs. 125 a head, but those at the lower figure are generally bought in some parts of Tenasserim or Siam. In Upper Burma prices are somewhat higher, the lowest figure being about Rs. 55 to Rs. 60. A fair number of buffaloes, which are cheap in Mergui are exported from there to the Straits usually conveyed in Chinese junks.

The wild buffalo.—These animals (*Bos Indicus*) may be found in one or two of the delta districts, also in Thayetmyo, Mergui, and possibly a small herd in Toungoo. They are said to be indigenous in

General Remarks.

certain localities which may be the case, but in others there is little doubt they are the descendants of tame animals run wild. In one instance I know of, a Burmese dacoit *Boh* (leader) in the last war owned many buffaloes which he kept in the jungle. After his death, and the disposal of his band, those buffaloes not appropriated ran wild, and now there is an immense herd, any member of which is as formidable to meet as any of those said to be indigenous.

The wild animals are as might be expected altogether finer and heavier animals. As in the case with most wild animals, old bulls often lead a solitary life and are dangerous brutes, even attacking without provocation. Wild buffaloes are without question the most ferocious of the bovidæ of the East.

They frequent swampy moist jungle, where they lie up during the day spending the early hours of the morning and evening, also the night, grazing. They roam in herds of varying number from a few members to a large number. Sometimes a wild bull makes his appearance in a tame herd, knocking out the young tame bulls and taking charge. When crossed result they are usually fine animals, massive, stand high, and possess stout horns. The temper is said to be uncertain.

Chapter XIII.—GENERAL REMARKS.

As to their origin whether as a result of selection or of the influence of the existing conditions, the present breed of both cattle and buffaloes appear to be eminently suited to the requirements of the people, who, wisely recognizing this fact, up to date make no effort themselves and do not appear to appreciate any that is made to introduce or cross with foreign stock. Any movement in this direction is made by foreigners in the country, and however much they may value the results obtained, it is pretty evident, that the Burman does not do so. So far, in my humble opinion, there is reason to be thankful for this, that up to date no foreign inducement has invaded the Burman idea or caused him to alter his opinion as to the thoroughly good qualities of the Burman cattle. We have witnessed to our sorrow what foreign innovations in matters

General Remarks.

of racing and polo have done for the Shan or Burman breed of pony. In former days Burmans raced their ponies either in matches or according to European methods, every one played polo on them, and excellent sport was obtained without any detriment to the breed, but the desire of some racing individuals, etc., to beat the Burman pony in racing by introducing small-sized foreign animals, or crossing them with the Burman to gain a little speed, has changed all this. The Burman who is keen on any kind of racing and by nature a bit of a gambler, would not be left behind in this matter, and the result is the practical annihilation of the Shan or Burman ponies which were adapted to the country, and the origin of all manner of nondescript breeds which cannot lay claim to all-round usefulness. I know as a fact that, in the few districts where ponies were supposed to be largely bred, owners of mares will at the present moment, with the one idea of gaining increase in speed and perhaps a high price, prefer to put them to any kind of stallion other than a fine good Shan.

Breeding.—The present method of breeding has already been noticed. It is more or less the natural one. We may assume that if there are a few bulls in a herd, it is the strongest and best of them only that are the stock-getters. I think that this system is preferable to a few perhaps indifferent stock-getters being used throughout a locality, whereby the whole would deteriorate. On the other hand, with several good bulls of the Burman breed, provided the conditions be such as to induce people to depart from their usual customs, there would without doubt be an advantage. But even with these it is only to be expected that a certain number of young stock would not turn out first class animals, and when one calls to mind the really few indifferent bullocks one meets with now, it is questionable whether the improvement would be such a marked one or at present even necessary as to warrant Government to make a large outlay in this direction. Any improvements I could suggest would rather be in the nature of increased care of cows, and this Veterinary Assistants have been instructed to

General Remarks.

impress upon the people. The young stock are invariably clean, well-nourished, healthy and well-looking after.

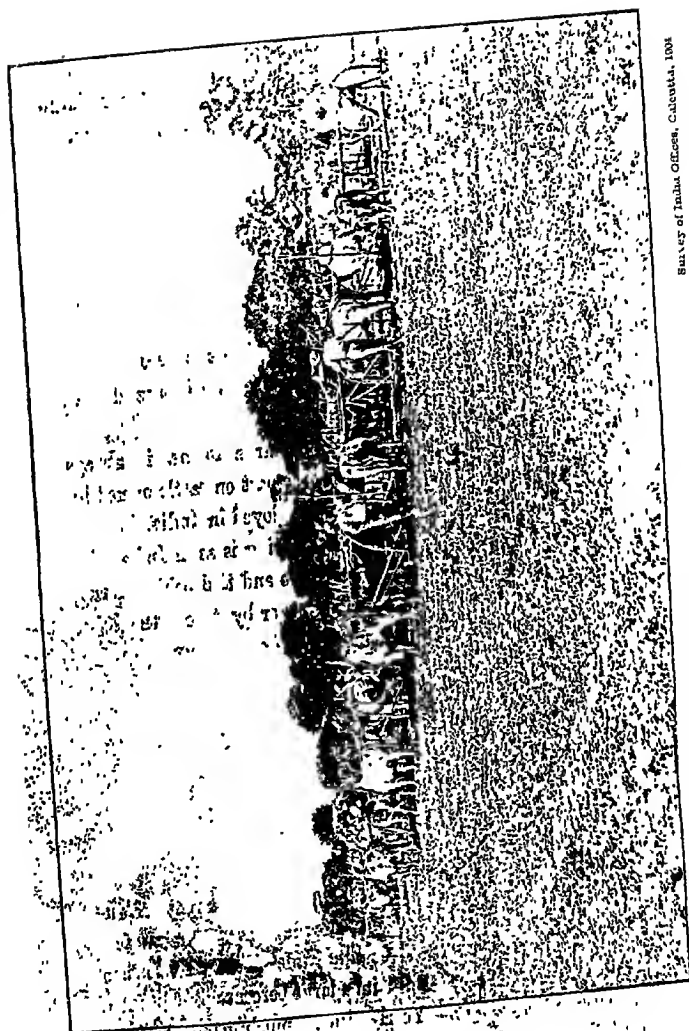
The milking capabilities could undoubtedly be improved on, but the question is, does necessity demand it? The Burman is supposed not to touch milk or its products. For cooking purposes he employs vegetable oils and thrives very well. He is unlikely to take to selling milk while he remains a Buddhist. The people are superstitious, and on occasions, such as when Burmans, especially Talaings (though it may not be in accordance with the tenets of Buddhism), wish to propitiate "*Nats*" by making offerings to them, they include milk in their offerings. After all, the use of milk is thus confined to a small foreign community, the European portion of which generally keep Indian cows and in a few instances Australian, but breeds are usually maintained intact.

The milkmen who are natives of India keep as a rule Indian cattle, the yield from a Burman cow not being much inducement to keep them or breed with them. Considering adulteration and the uncleanly habits of those who deal in milk in this country in regard to utensils and everything else, and the fact that dire maladies are attributed directly or indirectly to the use of milk, it occurs to me that perhaps a more laudable object, sanitary and otherwise, might be attained by educating the community who now take milk to do without it. The Buddhist community are individually strong, sturdy and healthy. It may be urged that foreign children, particularly European, require milk, but for such purposes a sufficiency of sterilized milk can always be obtained.

Management.—The method of feeding, etc., has been described.

With regard to housing.—In villages, owners of one or two yoke of oxen generally keep them under their houses or in a special "lean-to" alongside. Where a large number is kept a shed is provided to afford shelter from weather and it is generally placed within a bamboo or rough log enclosure.

Under extraordinary conditions, high floods, etc., special arrangements have to be made.



Survey of India Office, Calcutta, 1904

Villagers going out to work in fields.

Photo - black

Cattle Diseases.

In Upper Burma, in stockaded villages cattle are often kept at night between the first and second enclosure. Here too a large number of cattle are kept in pens. Shade and shelter is provided by a tree, shed, or fodder-stacks on raised platforms. On grazing grounds the animals are rounded up in the evening, in some places kept in sheds within or without enclosures, or are often tethered to pegs placed all around the sheds occupied by the herdsmen in charge. During certain seasons of the year when winged insect pests are in great numbers and annoy animals exceedingly, they are kept within circles of smouldering fires. Buffaloes where possible are kept tethered in shallow pools where they lie in a mud bath thus escaping annoyance.

Shoeing.—This is resorted to only in large towns, is always done by natives of India, and for the most part on cattle owned by them. The method of course is that as employed in India.

Method of securing.—Method of securing is as in India, *viz.*, by a rope passed through the nasal cartilage and tied behind horns. The operation is performed either by casting or by tying the beast close to a post by the neck. The muzzle is kept steady by being secured to another post. A sharp wooden skewer provided with an eye or merely split for attachment of a string, is pushed through the cartilage, the end of a cord attached to string is drawn through, and free ends tied behind the horns. The operation is generally performed between the age of three and four years.

Chapter XIV.—CATTLE DISEASES.

Cattle and buffaloes in Burma, although spared many of the scourges and minor troubles of other countries have some few which by reason of their virulence and wide distribution throughout the province annually claim a large percentage of victims.

Rinderpest (Kyaukpauk).—Yearly causes much havoc, both by reason of the number of deaths as well as the incapacitating for work for some time those which recover. It is found to a greater or less extent all over the province. In certain districts of the delta, however, its ravages are most extensive probably owing to the

Cattle Diseases.

more moist climate but also without doubt due to the fact that in the rain cattle are compelled to herd together on small areas.

Foot-and-mouth disease (Sha-na-kwa-na)—Is an annual plague, and though the percentage of mortality is usually small from it, the inconvenience and loss to owners is sometimes great, as now and again so many cattle are affected at the same time that ploughing operations, etc., are at a stand-still for want of oxen to carry on the work.

Anthrax (daungthan, houkua, yue-na, gyeik-na)—Though a very fatal disease does not prevail to anything like a great extent except in a few localities, and though it no doubt carries off a great number of animals yet, the mortality from this cause sinks into comparative insignificance alongside that from rinderpest.

Charbon symptomatique.—This disease is fairly common. The many names which Burmans have for anthrax are for the most part only distinctive terms according to the part or organ attacked in each case. This malady is not distinguished as a separate disease, but is considered by them to be one of the numerous manifestations of anthrax.

Though not so extensively distributed, the following diseases are to be met with in some localities:—

Tuberculosis (choong-gyauk)—Is seen more particularly in the neighbourhood of the larger towns, and its existence and spread may be due to some extent to the manner in which cattle are kept, especially by natives of India, who keep numbers of cattle herded together in closed sheds adjacent to, or even attached to, their own living places.

Dysentery (Three-thun-wun-kye)—Is sometimes seen about the beginning of the rains, when the rank grass and succulent herbage is springing up. In many cases it is rapidly fatal.

Diarrhoea.—In my experience is seen more often in buffaloes, but it is to be met with in most kinds of animals in this province.

Hæmorrhagic Septicæmia.—This disease is invariably confounded with anthrax, and the Burmans do not trouble to endeavour to separate it from that deadly. They look upon it and Charbon Symptomatique as varieties of anthrax which is known by the name of *Doungth*, and several other terms.

APPENDICES.

Appendix A.—HIDES, ETC.

THE buying and selling of hides, horns, etc., is for the most part carried on by Chinamen. There are few parts of a carcass other than those used as food that these men cannot find a use for, and they seem to make considerable earnings in this trade. The skin is first stripped off from the shank-bones and the pieces laid out to dry, to be afterwards used for making sandals, etc. The tendons are removed, cleaned and then suspended from strings or bamboos to dry, after which they are collected and tied in bundles, finally to become a delicacy, or to be used as gelatino. The bones are used for making various articles, the hoofs and horns making glue, etc. The price of a whole ox hide varies from Rs. 1-8 to Rs. 3-8 in towns, buffaloes Rs. 5 to Rs. 7. When sold by weight, from Rs. 50 to Rs. 60 for the former, Rs. 60 to Rs. 90 for the latter, per 100 viss (viss, about $3\frac{1}{2}$ lbs.). Horns fetch from Rs. 60 to Rs. 90 per 100 viss.

The Burmans employ hides for making sandals, also for drum skins. Priests employ them at times as mats, and they are also used by Burman and Karen mahouts to place under the elephant baskets. Raw hide thongs are employed for lashing the yoke to pole. Thongs are also employed by Chinese muleteers for lashing loads. Hides are purchased by Europeans and others for export.

For quantity and value of hides, etc., exported, see table on page 60.

Appendix B.—SHAN AND KACHIN CARAVANS.

In the cold weather a large trade in pickled tea, tobacco, walnuts, etc., is carried on between Shan States, Kachin hills and Burma by means of mule or bullock caravans. The Panthes and Yunnanese generally use the former, and the Shans and Kachins the latter animals. These bullocks are active animals, good climbers, and march independently of each other; one man generally looks after 5 animals. The day's march is usually from 10-13 miles and is done in the morning, or, when the road and light is good, at night. On arrival in camp the animals have their loads removed, are rubbed down and taken to water, and then turned out to graze under care of some of the men. The bullocks are then exposed to the sun for some time, and are afterwards shaken to prevent them from getting lumpy. To avoid miring, each animal's head and neck are then carefully arranged round the spine after the fashion of a screw. When the bullocks return in the evening they are kept inside this enclosure, and are tied to the loads or pickelled alongside. Generally speaking, galls are found to be rather the exception than the rule, and foot-sore cattle are rare. A certain percentage run spare to replace casualties. The average load carried by each animal is from 14 to 100 lbs.

Shan and Kachin Caravans.

THE SADDLE.

The saddle consists of two pillows or cushions, each about 24" by 19", which are generally stuffed with silk cotton, from the pods of the *B. Malabaricum*, but sometimes plain paddy husk is employed for the purpose. These pillows rest on the back of the animal, and are kept together with a rope which passes from rather high up behind the cushions to about the centre of them in front, where a knot is tied. Resting diagonally across each cushion is a thin flat piece of wood, in shape somewhat like the sole of a boot. These are kept in position by the abovo-mentioned rope which passes over them, and two strings which pass over the top of the saddle and connects them, the idea being to relieve the pressure from the baskets. At the upper and posterior end of the cushions is a piece of hide which is doubled over towards the front of the saddle and is secured with string. The object of this is to prevent the double piece of matting or hide, which is placed over the cushions, from working back. The appliance need for carrying the load consists of two long deep baskets, which are kept together by a pole running through loops in the baskets and which, for further security, is also tied with string. A second piece of rounded wood is inserted between the baskets at the top to give a wider hold on the back and make the load steadier. From the inner and posterior edge of each basket there is a piece of rope about 10 inches long which passes backwards, each end being tied to a semi-circular piece of wood. No girth is employed with this gear. The pads and matting having been laid on the back of the animal, the baskets are lifted on to the pad and the load is secured in the following simple manner. In front there is a broad neck-strap, usually made of plaited string or hide; this passes from one basket round the animal's neck to the other, where it is tied; behind there is a crupper which consists of a semi-circular piece of wood with a piece of rope coming from each end and passing under and around the tail (the tail-piece has a loop attached to the end through which the tail itself is drawn). On each string are a number of brass or wooden balls to prevent galling; and to complete the loading the two semi-circular pieces of wood are lashed together with strings or hide. For all ordinary purposes of transport, these caravan bullocks are very handy indeed, the great advantage being that they are easily obtained; little or no rations need be carried for them, as fodder is usually abundant; they are cheap, and generally speaking, give little or no trouble. Commissariat stores can, with very little inconvenience, be carried in the baskets, a usual load being about 120 lbs. In the Shan and Kachin trading from the north often employ the Panthe saddle (Chinese) with their cattle. It is quite different to the above. The tree of the saddle consists of two arches, front and rear, connected by two bars, one above, the other below. The panels are made up of thin arched boards which are adjusted with rivets to the under surface of the tree, the top of each arch being blong in shape with a slit in the middle for the attachment of straps. The gear is made of grey hide. There is a neck strap which passes from the top of the front arch round the neck, to meet a strap and buckle coming from the rear



Indo-1166.

Survey of India Office, Calcutta, 1904.

Shun pack bullock.

Insect Pests.

side of arch. The crupper consists of a dock-piece which is a hollow semi-circular piece of wood, through which is passed a piece of string; between the saddle and the dock-piece on each string are placed a number of balls to prevent chafing, and the free ends of the string are attached to the rear arch of the saddle. The connecting bars of the tree together with the sides of the arches form a rest or cradle on which the stand or crutch rides. This crutch is the appliance to which the load or baskets are secured. It is simply an arched frame, to the top of which are tied two pairs of thongs for lashing the load to the stand; the load should never touch the ground. Large oblong baskets are employed for carrying purposes. The great advantage of this stand is, that it can be lifted on and off the saddle without disturbing the load, thus saving much time and labour. The saddle is usually made out of pine wood which is light and durable. For the protection of the back, two pads on each side are used. The lower, resting on the back, is simply a pillow well filled with paddy husk, the upper one is not so thick and is also sometimes filled with paddy husk, but is more frequently made out of bark or fibre sawn in cloth. These pads are secured to the front and rear arches by thongs through the centre space of the saddle. No girths are used with this saddle. It differs only in a few details from that employed with the Chinese mules.

There are several objections to bullocks being employed on active service—

- (1) they are rather slow;
- (2) require good time to graze;
- (3) delays in calling in the animals and men getting their food;
- (4) they are easily stampeded;
- (5) owing to the animals marching independently and straggling, etc., a large escort would have to be provided;

on the other hand, they might perhaps be employed with advantage on the main lines of communication.

Appendix C.—INSECT PESTS.

At certain seasons cattle are subjected to much annoyance from insects, etc. Mosquitoes (*chin*), sandflies (*Apyak*), are very troublesome, and smouldering fires have to be kept burning to drive them away. In some stations it is not unusual to see ponies kept under aurlains. Two or three species gadflies (*Amor*) cause cattle much worry. There are several kinds of muscids which cause much annoyance due, probably more to their swarming than their bites, though they can carry out the latter operation effectively. Ticks (*Amwa*) are at certain times plentiful as regards number and species. They fix themselves more especially in the region of the groin, scrotum, udder, and occasionally cause severe sores if forcibly removed. They readily release their hold if smeared with oil. Leeches flourish chiefly during the wet season. Two kinds at least attack cattle, known as (*kyut*) or land-leech, and (*hahwa*) or water leech. They sometimes occasion great pain and suffering by creeping into and attaching themselves in the nostrils. If attached to the body, the Burmans

Dung.

cause them to release their hold by applying a mixture of lime, salt and tobacco-juice, or by placing a lighted Burmese cheroot (which is not unlike a small torch) near their skins.

Appendix D.—SNAKE BITES, CROCODILES, AND LOSSES CAUSED BY WILD ANIMALS.

Death due to snake-bite is not at all infrequent. The poisonous snakes in this province likely to hurt cattle are, the cobra (*Naia tripudians*), hamadryad (*Naia bungarus*), the banded krait, (*Bungarus fasciatus*) and Indian krait (*B. caruleus*).

Russell's viper, Daboia, (*Vipera Russellii*), which is very abundant in certain tracts, is, without doubt, the most dangerous of all the snakes in the province, claiming annually a large number of victims, both man and beast.

Crocodiles, which are numerous in many of the creeks of the delta, at times capture young animals while drinking, and pull them under.

Tigers and panthers kill a very large number of cattle annually.

Appendix E.—DISPOSAL OF CARCASSES.

The rules are that they should be buried, but in many parts during the rains this is out of the question. The carcasses are then thrown into creeks or rivers, and vultures, etc., feed on them while floating down. Though the people are by their religion not permitted to take life, they are ever ready to consume the flesh of animals that have succumbed to natural causes. In fact, whenever the regulations can be evaded, the carcasses are stripped of their flesh, which is eaten at once, or is smoked, or dried for future consumption. When mortality is heavy, as in severe epizootics, the carcasses that cannot be eaten are buried, or left to the dogs, vultures, etc., which in a very short time leave nothing but the bones.

Though no statistics are to hand regarding the evil effects of consuming diseased flesh, it is reasonable to suppose that some of the cases of meat-poisoning, choleraic diarrhoea, may be ascribed to this cause.

Appendix F.—DUNG.

Dung is not used for such a variety of purposes as it is in India. In fact, it may be said to be utilized, except by Chinese gardeners, who buy up a good deal to manure their fruit and vegetable gardens. Burmese also apply dung to betel, vine and sugarcane plantations, and in some parts of the province the cultivators sprinkle it over their fields. The Burmese rarely, if ever, use it as fuel for cooking purposes, but potters sometimes add cowdung to the wood-fuel when baking jars. It is also burned in the vicinity of cattle pens, etc., to drive off mosquitoes and other insect pests. Dung is generally cheap enough, and can often be bought for 8 annas a cart-load, and may sometimes be had for the asking.

Track-Law.

Appendices G, H, I, J, and K.—SOME RULES REGARDING CATTLE, TAKEN FROM THE "DAMATHAT"—BUDDHIST LAW.

G.—RULE OF CATTLE TRESPASS.

"When a strange ox gets into a fold, the owner of the fold must give notice of it to the chief of the village, who is to look out for the owner of the ox, and restore it to him. If an ox gets into a field and eats or tramples down the crop, the first time warning must be given to the owner of the ox, and if after that the ox still continues to do similar damage, the owner of the field may kill it, and, giving half to the chief of the village, may keep the other for himself."

H.—RULE—CATTLE FIGHTS.

"If two oxen or two buffaloes begin to fight, and one of them is killed, their owners are not subject to any fine, but if a loose ox kills one that is tied, then the owner of the first is bound to pay the value of the other. When the masters of both incite them to fight, and one of them is killed, the master of the other is bound to pay triple the value of the one that is killed. For any other damage that these animals are the cause of their respective masters are responsible."

I.—RULE—ROAD.

"The keeper of an elephant or an ox is obliged to hinder his beast from passing through places where people either sick or mad, or drunk, are lying, otherwise, if any one is killed by the animal, he must pay fifty ounces of silver, or twenty-five if only some serious injury is caused. If, however, the animal was furious and unmanageable, he is not subject to this fine."

J.—THEFT—RESTORATION.

"Whoever steals a horse must restore two, whoever steals an ox must restore fifteen, whoever steals a buffalo must restore thirty."

The price of animals is determined—An elephant is worth 100 rupees, a horse 50, a buffalo 3, an ox 2. The price diminishes in proportion to the smallness of the animal.

K.—TRACK-LAW.

The law by which the districts to which the foot marks of stolen cattle are traced shall be caused to make good the loss.

"Oh King! If any one's horses, buffaloes, or oxen be lost, and the foot marks are really traced to any district, that district may be said, if the fact be not ascertained, or there be no foot marks, there shall be no claim against the district. Wise men must note that, if horses, buffaloes or oxen be lost, and the owner shall track their foot marks into a village, the people of the village, the thugyi, that they are not free from blame, ought to go with him and point out the place where the foot marks leave the village. If they do not show the place by which they left the village, they should be caused to replace them."

 Hire of Oxen and Buffaloes.

Appendix L.—CARTS.

The Taluings are very particular with regard to the construction of wheels for their buffalo carts. The woods preferred for wheels are—

Pa-dauk (*Pterocarpus indicus*).
Thing-gan (*Hopea odorata*).
Bhoam-mai-za (*Albizzia stipulata*).
Than-that (*A. lucida*).
Kok-ko (*A. lebbeck*).
Lay-za (*Lagerstromia tomentosa*).
Htoak-sha (*Vitex lencexylon*).

The woods generally preferred for the axles are—

Gyo (*Schleichera trijuga*).
Hpek-won (*Berrya mollis*).

The wood for the poles or shafts are—

Hpek-won.
Thu-bwot-gyco (*Milium velutina*).
Yeng-daik (*Dalbergia cultrata*).

For the body, any durable wood is used, but *Pyingado* (*Xylia dolabriformis*) and *Bhan-bwai* (*Careya arborea*) are most esteemed.

A cart constructed of the above named woods according to estimate would cost Rs. 400 roughly. These wooden carts and wheels make a most horrible creaking noise, which may be heard while travelling half a mile off, but which the people, the Taluings especially, consider so musical, that this quality adds greatly to the value of a cart.

Not a single nail is used in the construction of the carts. The cost of an ordinary iron-tired wheeled cart averages from Rs. 40 to Rs. 50. The spokes and the body are entirely of teakwood;—the poles and the yoke are of *eng*, or *pyingado* wood.

Total number of carts in province, 477,608.

Appendix M.—HIRE OF OXEN AND BUFFALOES.

Almost all cultivators have cattle of their own and do all their agricultural work themselves, but in a few districts where there are large holdings, both laborers and cattle are frequently hired. The rates of hire for cattle vary greatly. For one yoke of buffaloes for the season, in some districts of Upper Burma it is 25 to 30 baskets of paddy, while it is from 35 to 45 in other districts. In Lower Burma, generally 40 to 50 baskets. For one yoke of oxen for the season in Upper Burma it is 20 to 30 baskets of paddy. In Lower Burma, 35 to 40 baskets of paddy. The rates vary from year to year according to the greater or less number of cattle available.

Total number of ploughs in province, 588,546.



Fluted block.

Survey of India Office, Calcutta, 1901.

Bullocks and cart showing solid wheels with patent bush made of bamboo.

Colours of Cattle according to Burmese ideas; hair flexures, etc.

Appendix N.—COLOURS OF CATTLE ACCORDING TO BURMESE IDEAS, HAIR FLEXURES, ETC.

The Burmans prefer bays and duns to all other colours. Broken colours are not fancied. Generally speaking, the people like to drive well-matched pairs. Different coloured oxen in a yoke are not admired. If the buyers can obtain pairs, they are not averse to iron-grays, coal blacks, or dappled duns.

The following are the colours with their Burmese names:—

Bays.—known as *Nwa-ni* (red cattle); found in varying shades—*Nwa-ni-nyo* (reddish brown), *Nwa-ni-shwa* (golden bay), *Nwa-gyit-ni*, *Nwa-gyit-shwa* (dark reds), etc.

Duns.—*Nwa-wa* (yellow cattle). Vary from dark duns to shades of straw colour. (*Nwa-gyit-wa*) and (*Nwa-gyit-pok*). Dappled duns—in which oxen are marked with roundish spots of varying size and colour, (*sa-oo*, *sa-oo-wa*, *sa-oo-kwet*). The markings in some of these dappled duns are quaint.

Greys.—*Nwa-pya* (grey cattle). Rather an unusual colour, but admired. (*Nwa-pya-ni*, *Nwa-pya-nyo*, *Nwa-pya-phyu*, *Nwa-pya-sein*) according to depth of colour, i.e., light; dark, etc.

White.—*Nwa-phyu* (white cattle). Rarely met with, and those seen are unlikely to be of pure Burman breed.

Black.—*Nwa-net* (black cattle). There are two distinctive shades of colours, i.e., coal-black (*Nwa-net-than-yaung*); rusty black (*Nwa-ta-nyin*).

Pie-bald.—*Nwa-gya*, i.e., where the black and white colours are pronounced.

Brindle.—*Nwa-gyaung*, uncommon.

In those cases where the white spots running through a black coat are very small, i.e., about the size of cotton seeds, such are termed *Wa-si-pyauk* (mottled).

The terms *Ta-nyiu-gya*, *Nwa-net-tang-yin* are applied to grey animals, marked with black or dark spots of varying size.

The following are some of the colour marks which the Burmans dislike, or will even refuse to buy oxen possessed of them:—

White marks inside the arm called *lot-pan-gya*.

White marks under the chest, resembling a tugtoo (*tau-k-ta*).

White marks inside the arm, resembling a lizard (*ain-hui-young*).

White marks inside the arm, resembling a fly (*yin*).

White zig-zag marks inside the arm (*Hla-tabyet*), literally, flash of lightning.

In addition to the above, there are other points which almost every Burman avoids, and these are—

An awkward set off or position of the horns, particularly, one growing upwards and the other downwards (*gyo-te-lu*).

Any deformity or abnormality of the horns (*gyo-hin-young*).

A short tail, the tuft of which consists of rough coarse thorn like hairs, (*ami-kyet-su*).

Treatment of Diseases.

- A disproportionate lower lip, i.e., the lower being much thicker and larger than the upper one. Occasionally raising the head upwards and making a curious noise, such as a calf often does while sucking (Kaungkin-noso), or, occasionally keeping the head down and behaving as above-mentioned (myegyi-noso).

Making a peculiar noise during sleep (sa-hoak).

Uttering a peculiar sound while eating (sa-haiu).

The Burmans are very particular with regard to certain hair flexures or marks seen in some animals, and cattle with any such blemishes are not at all appreciated. The following are some of the flexures or hair marks objected to viz.:—Bwe-sin-myetkya, Bwe-myotkya, Se-gyi-pate, Bwe-chet-pauk. There is a saying among the Burmans that if a person keeps an animal with any of the above marks he is sure to meet with ill-luck. Price for such an animal invariably very small. The Burmans say that the King's oxen employed for batteries at the time of the Burmese Government were very fine animals. They were entirely free from blemishes and such hair marks as above noted. It is stated in the Gazetteer that the elephants and bullocks "*shikkoed*" just as the soldiers did. The elephants lowered their trunks and the bullocks dropped on their knees to the tap of the gong, and rose again when the rise-up was sounded. Their drill was infinitely better than that of the men and was rigorously insisted on.

Appendix O.—PACE.

The paces of bullocks are, a-yine-thwa (natural walk), ka-son-byo (trot), or tha-min-byo (running like a deer), che-sin-thwa (walking like an elephant).

Appendix P.—TREATMENT OF CATTLE DISEASES.

Burmese medicines and the methods employed by owners in the treatment of their cattle.

RINDERPEST.

[Burmese—Kyauk-pauk), Wun-cha, Kabana, Kalana, etc. Karen—(Lo-sah). Shan—(Auk-mat).]

Immediately the disease is recognized, a draught is administered to each of the affected animals; it is usually composed of the following ingredients:—

Arauc.	about one ounce.
Strong solution of nuxom.	one "
Black cardway	half "
Salt	one "
Eggs	one "
Sesamum oil	one "

This is mixed into a paste, and given with about 12 ounces of water twice daily.

Treatment of Diseases.

Black caraway	Fennel flower.
(<i>Nigella sativa</i>)	a kind of popper.
or powdered nutmeg	one fruit.
Cocoanut milk	from one fruit.
This is mixed and given twice daily.	
Powdered rice	10 tickals.
Jaggery	1 tickal.
Sesamium oil	$\frac{1}{2}$ "
Lime water (thick)	1 "
This is boiled, and when cool given once or twice daily.	
Borax powdered	one tickal.
Camphor powdered	half "
Gentian (<i>chirotta</i>)	half "
Water	one pint.

This is mixed and given once a day for two days.

The idea in giving these is to cause the system to throw off the poison in the form of eruptions on the body. The people have learned that it is in cases where the eruption is well marked that the disease is more likely to take a favourable course.

Should a laxative be considered necessary, the following mixture is given:—

Tamarind fruit	5 tickals.
Garlic	10 "
Salt	5 "
Jaggery	10 "
Water	10 to 20 ounces.

In cases where there is much purging, a strong decoction is prepared from the barks of the mango and catechu trees, and about ten tickals weight given as a dose; or a pill consisting of five tickals powdered Zibyn fruit (*Cicca macrocarpa*), and half a tickal of salt.

Catechu is the boiled sap from the *Acacia catechu*. Opium, either in the solid form (when four annas weight, about 40 grains, is given), or in solution, mixed with arrak, is employed for the same purpose. [$1\frac{1}{2}$ tickals=1 chittak, Indian weight.]

The shell of a hen's egg is frequently employed as a measure for drugs.

Foot and Mouth Disease.

[*Burmese*—(Kwa-na-sha-na) *Kan*—(Pai-shah, khaw-shah) *Shan*—(Kwa-sit) *Tai-lyet-sit*.]

In this disease, when the mouth is chiefly affected, it is a common custom to apply a small quantity of a mixture of powdered camphor and salt over the tongue and dental pad, or in some districts a pill containing ripe tamarind fruit ten tickals, salt three tickals, and sand soap three tickals is given twice daily.

For the feet a decoction is made from the barks of the mango, guava, and of the jujuba trees (*Zizyphus jujuba*), or of the tree (*Euphorbia mangifera*) and *Phan-ga* (*Torquillaria tomentella*), and applied as a lotion; camphor, coal dust, or tar combined with sweet oil, are employed as dressings.

Treatment of Diseases.

When there is an outbreak of disease in the hot weather, the animals are made to walk on hot sand. Deaths occur from this disease on the distant grazing grounds, where it is difficult to look after the animals.

ANTHEAX.

[*Burmese*—(Gyaik, Daung-than, Yinc-na, Houk-na). *Karen*—(Khli-sah).
Shan—(Law-kaw-an-lan-sit).]

For any swellings that occur a liniment is prepared by mixing soot, turmeric, and sassaum oil in equal parts, or a mixture is made of turmeric, assafetida, and sassaum oil in equal parts, and smeared over the affected parts.

The following is employed as a purgative drench—ten to fifteen tickals of the juice and powdered leaves of the mudar plant, Ma-yo (*Calotropis gigantea*), salt, a sufficiency, water about ten tickals; as a dose, from 8 ounces to 10 ounces is given at a time. When a diuretic is considered necessary, an infusion or decoction is made with the Nepal spinago (*Amarantus gangeticus*) or the spinous amarantus (*Amarantus spinosa*) combined with infusion from a plant known in Burma as “Kala myotsi” lit. foreigner’s eye; to this is added about two tickals of salt.

If the animal trembles and straddles his legs, etc., a brisk walk is forced, after which the following dose is given:—Five tickals of honey mixed with one-sixteenth tickal of Sha-zaubgyi juice (*Euphorbia jacquiniiflora*).

As further treatment, salt is sprinkled over the back and loins, over which a light cloth is then thrown; the back is then thoroughly kneaded with hands and feet, or in some cases striking the animal with backward strokes of tamarind twigs is practised.

HOVEN.

[*Burmese*—(Wun-byai-wun-yaung).]

These cases are simply treated by giving a laxative composed of salt, ginger, tamarind, treacle, garlic and water; and assafetida is sometimes added.

CATARRH.

[*Burmese*—(Hna-so).]

This condition is treated by blowing into the nostrils a small quantity of stuff mixed with salt. Others give the following mixed with food twice a day—half tickal each of camphor, and chiretta, and one each of borsx, and sand soap.

GENERAL DEBILITY.

[*Burmese*—(Apo-pin; Raja-chon-na).]

The following is employed in the treatment of this complaint—pieces of pumpkin, oil-cake, siu-don-ma-nwe (*Tinospora nudiflora*), kiü-muo-chin leaves (*Acacia rugata*), tamarind leaves, rice, and salt, a few ounces, are put in an earthen jar and covered with a quantity of cold water; this is allowed to stand for some little time, after which about ten tickals’ weight is given twice daily.

Treatment of Diseases.

DYSENTERY,

[Burmese (Thwo-pa-wun-kye-na)], and

DIARRHŒA,

[Burmese (Wun-kye-na)],

are treated with opium, or astringent decoctions, such as barks of Let-tok tree (*Alstonia scholaris*), Zi-byu tree (*Cicca macrocarpa*), Kye tree (*Barringtonia racemosa*), and Min-goot (*Garcinia mangostana*).

WORMS.

[Burmese—(Than).]

For the removal of internal parasites, the powdered root of *Amomum corymbosum*, with the powdered fruit of the *Cicca macrocarpa*, mixed with little salt, is given with a pint of water: Betel-nut in two-fickal doses is used for the same purpose as also the powdered seed of the Pouk tree (*Butea frondosa*).

MANGE.

[Burmese—(wè).]

The affected parts are dressed with earth oil or plain cowdung. Another good treatment is as follows:—The affected parts are washed with a lotion consisting of one viss (three and half pounds) coal tar, one viss camphor, and one viss of cocanutt oil, to be applied three times a day for a few days.

CHOKING.

[Burmese—(Asa-nin).]

The treatment of choking, as described to me, is a novel one, and very easy to apply. It consists in hanging on to, and jerking, the tail until such time as the affected animal sees fit to either eject or swallow the obstructing agent. I have not had an opportunity of observing the efficacy of this mode of treatment.

MAGGOTS.

[Burmese—(Lutis).]

For destroying maggots in wounds, etc., powdered tobacco leaf and chunam in equal parts are applied; also camphor lime juice, etc.

It is a general custom in this country that no matter what disease an animal may be suffering from, the treatment is begun by applying medicines to the eyes. This usually consists of a mixture of ginger, capsicum, salt and jaggery, which is made into a paste of small quantity of which is applied to the eyes. Cartmen sometimes apply this mixture to the eyes of their animals after a long and fatiguing march.

List of Drugs employed in Burma.

Appendix P-1.—LIST OF DRUGS EMPLOYED IN BURMA IN THE TREATMENT OF CATTLE DISEASE.

Vernacular Names.	Botanical Names.	Uses.
Ma-yo . . .	<i>Calotropis gigantea</i>	Externally vesicant, used in certain skin affections and applied to anthracoid swellings. Internally given with salt as a purgative in anthrax.
Shah-zo . . .	<i>Acacia catechu</i> (catechu)	Astringent, either an infusion of the bark, or prepared catch is given in rinderpest and diarrhoea.
Kūn . . .	<i>Areca catechu</i>	Astringent and anthelmintic.
Bain . . .	<i>Papaver somniferum</i>	Astringent, sedative, and narcotic, given in rinderpest and bowel complaints.
Pa-daing-katta . . .	<i>Datura fastuosa</i> , var. <i>alba</i> .	Powerful narcotic, the leaves are given mixed with sulphate of iron in hydrophobia.
Hsai . . .	<i>Nicotiana tabacum</i>	The powdered leaves are blown into the nostrils in cases of rinderpest, and indigestion.
Ok-shit-thi . . .	<i>Egle marmelos</i> (Baol)	An infusion from the rind of the fruit is given in fever, and as an astringent in dysentery, diarrhoea.
Nga-yoke-thi . . .	<i>Capsicum minimum</i> (Chillies).	Stomachic, the powdered fruit is also given in foot-and-mouth disease.
Za-daik-po . . .	<i>Myristica fragrans</i> , (Nutmeg)	Powdered fruit is given with spirits in dysentery and rinderpest.
Sa-ba-lin . . .	<i>Andropogon Schoenanthus</i> (Lemon grass).	Infusion is used as a wash for sore eyes.
Mu-ko . . .	<i>Tamarindus indica</i>	The fruit is used as a laxative.
Ming-oot . . .	<i>Carica papaya</i> (Mango)	Astringent, an infusion of the rind is given in colic and dysentery.
Kyauk-pa-yone . . .	<i>Benincasa porifera</i> (Mistle Gourd).	Puric, given in debility and indigestion.
Shah-koh . . .	<i>Fernia Nattex</i> (imported).	Externally it is applied to sores, internally it is given in chest affections, and also in hoarseness.
Kadst . . .	<i>Ornithoglossum falcatum</i> (Three-leaved Gaper).	Externally, the powdered leaves are mixed with salt, and applied to inflammation, etc.

List of Drugs employed in Burma.

Vernacular Names.	Botanical Names.	Uses.
Ohn-thi . . .	<i>Cocos nucifera</i> . . .	Cocconut oil is used as a dressing for sores.
Thin-baw-thi . . .	<i>Carica Papaya</i> . . .	Externally the juice is used as a vesicant.
Samon-net . . .	<i>Nigella sativa</i> . . .	Given with other drugs in rinderpest.
Ngu-gyi . . .	<i>Cassia Fistula</i> (Sweet-fruited Cassia).	An infusion made from the leaves and pulp is given as a purgative, and possesses powerful properties.
Wah-net . . .	<i>Bambusa nana</i> . . .	The leaves of the black bamboo are given as a diuretic.
Tha-yet . . .	<i>Mangifera indica</i> (Mango tree).	The powdered bark mixed with nutmeg and lime water is given in rinderpest.
Soon-ha-lun . . .	<i>Phoenix dactylifera</i> (Date palm).	Astringent. The seeds are rubbed down with water, and given in rinderpest.
Ma-la-ka . . .	<i>Psidium guajava</i> . . .	An infusion of the bark is used as a lotion in foot-and-mouth disease.
Zi . . .	<i>Zizyphus jujuba</i> (Byer tree of India).	Uses same as those of the white guava.
Zi-byu . . .	<i>Citrea macrocarpa</i> . . .	The powdered fruit mixed with salt is used in rinderpest.
Mök . . .	<i>Aloes (species)</i> . . .	Given as a purgative, also used in small doses in foot-and-mouth disease.
Ka-baung . . .	<i>Strychnos nux vomica</i> . . .	An infusion from the root and pulp of fruit is employed as a lotion in foot-and-mouth disease, also tonic.
Hinka-nwò . . .	<i>Amarantus gangeticus</i> <i>Amarantus spinosus</i>	Diuretic, given in doses of repetition of urine.
Hti-ga-yon-su-bouk . . .	<i>Mimosa pudica</i>	Used as a diuretic and cooling medicine.
Nga-yoke-kaung . . .	<i>Piper nigrum</i>	Carmine, given in doven.
Sá-nyin . . .	<i>Curcuma longa</i>	Externally it is rubbed down and mixed with sesamum oil, and is applied to wounds and inflamed surfaces.
Pa-yoke . . .	<i>Sulphur (imported)</i>	The powder is used in foot-and-mouth disease.

List of Drugs employed in Burma.

Vernacular Names.	Botanical Names.	Uses.
Thot-yin-ni	<i>Croton malaccensis</i>	The roots are used as purgative, and the leaves are used with fomentations in rheumatism. Seeds and bark also as purgative.
Mè-nai	<i>Indigofera tinctoria</i> (Indigo).	An infusion of the plant is applied to anthracoid swellings.
Shouk	<i>Citrus bergamia</i> (Large lime tree).	The juice of this fruit mixed with honey is given as a laxative.
Sin-don-ma-nwo	<i>Tinospora nudiflora</i>	Tonic, an infusion of plant is given in cases of debility.
Let-tok	<i>Alstonia scholaris</i>	Astringent, the infusion of the bark mixed with other drugs is given in rinderpest.
Thit-kyah-bo	<i>Cinnamomum zeylanicum</i>	A common drug used almost in all internal ailments.
Kók-ko	<i>Albizia Lebbok</i>	Astringent, the decoction of the bark is given in rinderpest.
Ban-bwe	<i>Caraya arborea</i>	Ditto.
Gwo	<i>Spondias mangifera</i>	Ditto.
Yá-gyin-ya	<i>Securinoga obovata</i> ; <i>Dalbergia spinosus</i> .	An infusion made from leaves is given in rinderpest and diarrhoea.
Sat-thwa-poo	<i>Pandanus odoratissimus</i>	The infusion of the root is given in rinderpest as an astringent.
Dan-da-loon	<i>Moringa pterygosperma</i>	Ditto.
Maung-ma-kaw	<i>Combretum oxitensum</i>	The infusion of the leaves is given in rinderpest as an astringent.
Yon	<i>Anogeissus acuminatus</i>	Ditto.
Hi-zat	<i>Spilanthes paniculata</i>	Ditto.
Ta-mung-yá	<i>Acauquianopylon</i>	The decoction of the bark is given as an astringent in rinderpest.
Kyung-yá	<i>Oreoxylum indicum</i>	Given in lough, the fruit is finely powdered and is mixed with other drugs.
Tham-that	<i>Albizia lincida</i> ; <i>Stereospermum fimbriatum</i> .	The leaves are powdered in a mortar and the juice taken is given in cases of pneumonia.
Eik-mwe Pyin-ma	<i>Lagerstrœmia flos re-ginae</i> .	The fruit is powdered well, and with other powders given in catarrh.

List of Drugs employed in Burma, etc.

Vernacular Names.	Botanical Names.	Uses.
Park-pyu . . .	<i>Sesbania grandiflora</i> . . .	The root is powdered and forms an important item in the treatment of catarrh.
Pa . . .	<i>Corypha umbraculifera</i> . . .	A decoction of the leaves is given in distention of the rumen.
Doe . . .	<i>Entada scandens</i> . . .	The decoction of the bark is used as a lotion in foot-and-mouth disease.
Htawk-sha . . .	<i>Vitax leucorylon</i> . . .	Ditto.
Kyo . . .	<i>Barringtonia racemosa</i> . . .	Ditto.
Lein . . .	<i>Terminalia pyrifolia</i> . . .	The decoction of the bark is used as a lotion in foot-and-mouth disease.
Pan-ga . . .	<i>Terminalia tomentella</i> . . .	Ditto.
Pou-ma-thein . . .	<i>Blumeria balsamifera</i> . . .	Ditto.
Tha-koot . . .	<i>Spathodea rheedii</i> . . .	The infusion of the bark is given in retention of urine as a diuretic.
Thin-win-pauk . . .	<i>Pongamia glabra</i> . . .	The root finely powdered is given in urinary diseases, mixed with rice water or jaggery.
Nwe-cho . . .	<i>Thunbergia laurifolia</i> . . .	Used almost in all respiratory diseases.
Kyet-mauk . . .	<i>Naphelium litchi, longana, and hypoleuca.</i>	The root is used in the treatment of cataract.
Ka-nyut . . .	<i>Asparagus scrozosus</i> . . .	The pulp is used in the treatment of cataract.
Thin-baw-ma-za-li . . .	<i>Cassia alata</i> . . .	Decoction of the leaves given as a laxative mixed with salt.
Lin-he . . .	<i>Acorus calamus</i> . . .	The powdered root is given in dysentery.
Se-palo . . .	<i>Elephantopus</i> . . .	The powdered root mixed with other drugs is given in indigestion as a tonic.
Pa-de-gaw . . .	<i>Elephantopus</i> . . .	The powdered root is given in catarrh and colic mixed with ripe tamarind fruit.
Nga-pen-ze . . .	<i>Morlea tomentosa</i> . . .	Ditto.
So-la-na-pa . . .	<i>Cephaelis paniculata</i> . . .	Ditto.

Feeding, including Grazing.

Vernacular Names.	Botanical Names.	Uses.
Pin-zain . .	Ocimum generally .	The seeds are used as a lotion for eye diseases.
Meik-tha-lin . .	Zinziber barbatum .	Rubbed down in water it is commonly applied to inflamed surfaces in anthrax, etc., as an emollient, also much used in fomentations.
Thin-ban . .	Hibiscus tiliaceus . .	The juice of the root is given with salt in retention of urine.
Kyot-hin-ga . .	Momordica charantia .	The juice of the leaves mixed with garlic, ginger, seeds of chillies, and other drugs, is applied to the eyes in retention of urine.
Kia-mnn-chin . .	Acacia rugata . .	The leaves are put into an earthen pot, and burned. The ashes are given in urinary diseases as a diuretic.
Ka-zoon . .	Batatas edulis . .	Ditto.

Several varieties of Euphorbia and Leguminosae are used as purgatives.

The inorganic medicines in use are calomel, chloride of ammonia, borax, nitrate of potash, sulphur, green, blue and white vitriol, arsenic, and, lastly, petroleum (carthoil).

Appendix Q (a).—FEEDING, INCLUDING GRAZING.

The methods of feeding and grazing are as follows:—

(a) Feeding from wooden troughs made by hollowing out palm stems.

(b) Feeding from a platform of jungle wood or bamboo.

(c) Grazing tethered to a "Moungdaing."

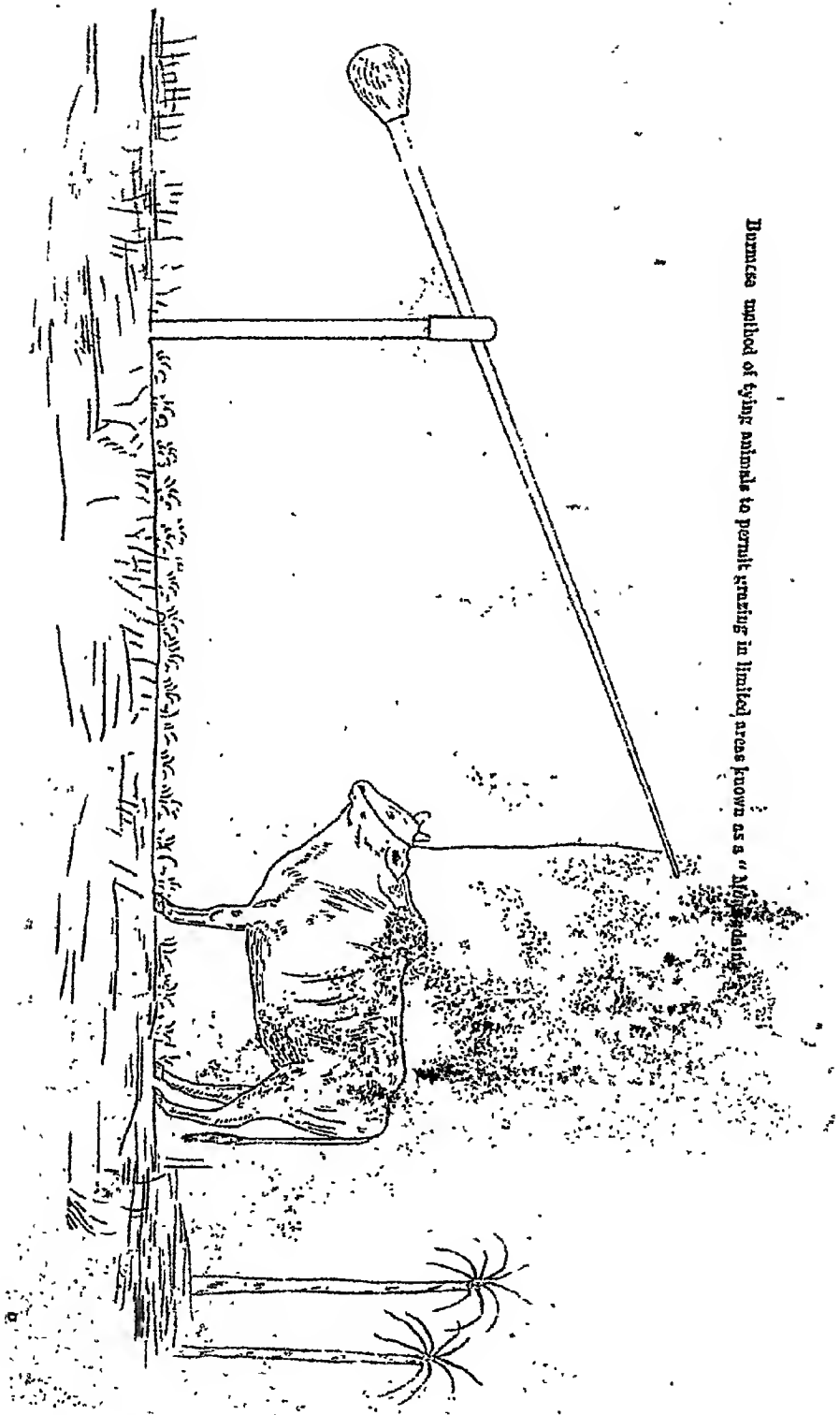
(d) Sending out to graze, the animal being ridden by a boy or girl.

(e) General practice of sending out animals in charge of professional herdsmen.

(a) This is the general method employed by Burmans in and about large towns and in the district during the working season.

A man having a few oxen and requiring their services, usually has a trough put up resting on Y's of jungle wood in his compound, or a platform erected about two feet or a little more from the ground. Grass, straw, etc., is brought to the cattle and placed on the platform, and if oil-cake, rice husk, peas or other form of artificial food is given it is placed in the trough. The Burmans have an idea that animals when feeding should have their forequarters raised, so the ground near the trough is slightly raised or a plank or two is put down as a footstool. The same is done with ponies. The reason given is, that it makes the

Burmese method of tying animals to permit grazing in limited areas known as a "Mongkading"



Fodder.

animals stand up and also prevents their getting what the Burmese term a cow-belly (biko-shwai), a grass belly.

(b) The Mlongdaing is a handy contrivance and is constructed as follows:—

A light pole or post is placed in the ground. On the top of the post is a cap (pivot-like) with slots, etc., to which is fixed horizontally a long bamboo. The thicker end is often slightly weighted with a lump of clay. From the other end is a rope which is secured to another rope leading from the nose rope of the animal.

The system has its advantages. No attendant is required, an animal can take exercise, and can be grazed in limited areas such as in the vicinity of crops, gardens, etc. The contrivance being very light can be moved from place to place without trouble.

(c) During the season the crops are growing it is common to see a number of cattle, each mounted by a boy or girl. A youngster holds on to the nose rope and grazes his charge along the bunds between fields, etc.

(d) This system has been referred to—See Chap. IV, page 13.

Appendix Q (b).—FODDER.

Vernacular Name.	Botanical Name.
TEXES.	
Toin-thay	<i>Nauclea parvifolia</i> .
Thit-pa-yading	<i>Nervilia sessifolia</i> .
Yon	<i>Phrynium</i> .
Eng	<i>Dipterocarpus tuberculatus</i> .
Binga	<i>Nauclea rotundifolia</i> .
Ka-oung-gyi	<i>Oleodendron infortunatum</i> .
Yin-deik	<i>Dalbergia cultrata</i> .
Myat-ya	<i>Grewia microcarpa</i> .
Ta-naung	<i>Acacia leucophylla</i> .
Ok-lin	<i>Strobilus aspera</i> .
Kok-ko	<i>Albizia lebbek</i> .
Pa-lan	<i>Bauhinia racemosa</i> .
Ka-oung (common)	<i>Ficus bengalensis</i> .
Thanbin	<i>Terminalia oliveri</i> .

These are trees which the Burmese say cattle readily eat the leaves of when young.

Fodder.

Vernacular Name.	Botanical Name.
SHRUBS.	
Myank-kyoin	Flagellaria indica.
Taw-bei	Dolichos pilosus.
Mo-gyoung-nwè	Derris scandens.
Nyan-bin	Seebania paludosa.
Ka-doo	Blumea (various species).
Kye-ne-bin	Vitex lanecoloria or Flomigia lineata.
Wet-che-pa-nai	Urena, sp.
Gon-miu	Amomum corynostachyum.
Ok-hmoing	Argyrea zeylanica and barbigera.
Ta-min-cek	Agyneia coccinea or Glochidion coccineum.
Zee	Ziziphus jujuba.
Kaung-yan	Hibiscus rosa sinensis.
Nga-yan-pa-doo	Clerodendron nutans.
Kat-si-nai	Sida Triumfetta.

Cattle are very fond of the leaves. It grows generally in low lying pastures, among brush wood.

PERENNIALS.

Thic-bau	Hibiscus tiliaceus.
Nwai-nyo	Thunbergia.
Bi-zat	Spilanthes paniculata.
Kin-bon	Medeoa trilobata.
Su-yit	Acacia pennata.
Hin-nu-nwè	Amarantus spinosus.
Myt-pyt	Portulaca oleracea.
Ti-ga-yon	Mimosa pudica.
Ali-guang-nwè	Derris scandens.
Sin-don-ma-nwè	Argyrea nudiflora.
Ok-hmon-nwè	Argyrea barbigera.

These grow in cultivated fields, gardens, etc., cattle readily eat the leaves and tender shoots.

Fodder.

Vernacular Name.	Botanical Name.	Description of localities in which it grows.
GRASSES.		
Mye-za . . .	<i>Cynodon dactylon</i>	In rich soils and where manure collects. It is also found to grow in all well-drained soils, also in Yon, etc.
Ngon-myt . .	<i>Chrysopogon aciculatus</i> .	In low land pastures where the soil is fairly rich.
Pa-daw-nwè .	<i>Panicum dactylon</i>	Elevated, dry, loamy soil—also in paddy-fields lying fallow.
Zeln . . .	<i>Panicum indicum</i>	Grown amongst bushes and under the shade of trees.
Myet-nwè . .	<i>Panicum burmanni</i>	
Gyo-kank-myet	<i>Panicum floitans</i>	Grows abundantly in most rich soils, especially along the banks of streams, ditches and edges of paddy fields.
Sin-ngo-myet .	<i>Eleusine agyptiaca</i>	On poor and dry ground.
Myet-loy-gwa .	<i>Dactyloctenium aegyptiacum</i> .	In lands ploughed and fairly moist.
Sat-loi-graung .	<i>Commelina communis</i> .	In swampy places or in shallow lakes that dry up during the hot season.
Lbi-pa-deuk .	<i>Monochoria vaginalis</i>	In low paddy-fields lying fallow. Also on inundated islands and sand banks.
Wet-la . . .	<i>Cyperus compressus</i>	
Wet-kyut . .	<i>Zollingeria macrocarpa</i> .	On all dry situations after fires have taken place.
Wa	<i>Gossypium herbaceum</i> .	
Ka-nyut . . .	<i>Asparagus acerosus</i> .	In rich loam capable of retaining moisture and recently thrown out of cultivation.
Kya-hin-galo .	<i>Ipomoea vitifolia</i>	
Hin-noo-nwè . .	<i>Amarantus spinosus</i> .	In tanks and water-logged places.
Gon-min . . .	<i>Amomum oorynosia-chyum</i> .	
Nwè-ga-zun . .	<i>Calophyllum Roxburghii</i> .	In tanks and water-logged places.
Ka-zun-ni . .	<i>Phragmites Roxburghii</i> .	
Fan-yin . . .	<i>Andropogon nindatum</i> .	In tanning cultivated fields and in gardens.
Sa-pa-lin . .	<i>Andropogon osculentum</i> .	

Cart-racing.

Vernacular Name.	Botanical Name.	Description of localities in which it grows.	
GRASSES—continued.			
Thet-kai-nyin	<i>Imperata cylindrica</i>	Elevated, dry, loamy soils among brushwood.	
Kyn . . .	<i>Arundo</i> sp. . .	Found growing on the sides of rivers under bushes and in moist noncultivated lands.	
Kins . . .	<i>Saccharum spontaneum</i> .		
Kynn . . .	<i>Saccharum officinarum</i>	Cultivated.	
Vernacular Name.	Botanical Name.	Description of localities in which it grows.	REMARKS.

CEREALS.

Shin-myi-pyangng.	<i>Sorghum vulgare</i>	In the dry zone of Upper Burma.	This millet is largely used as an article of food in Upper Burma. Cattle are fond of the straw, green or dry; in fact it is one of the chief articles of fodder in dry zone.
Hnan-sa-pyangng.	<i>Panicum jamentosum</i> .	Ditto	Guinea grass. This grass is cultivated and grows abundantly. It requires plenty of water and attention as regards weeding; it is easily propagated.
Pyangng-boo	Zea, mays	Grown all over the country.	Indian corn. The stalks and leaves are given to cattle as fodder, the raw seeds are sometimes given to horses as a substitute for grain.
Lu	<i>Paspalum Panicum</i>	In some of the remotest parts of Upper Burma.	The cattle are fond of the straw.
Hset	<i>Panicum miliaceum</i>	It grows best on an elevated light, rich soil and generally sown after the rains.	This cereal is cultivated throughout Burma for its grain and fodder.
Sa-ba	<i>Oryza sativa</i>	Throughout the Province on low lands.	Rice is universally cultivated and cultivation has produced many varieties. The straw is carefully collected and used as fodder for cattle. Horses and other animals are fed on it when grass is scarce.

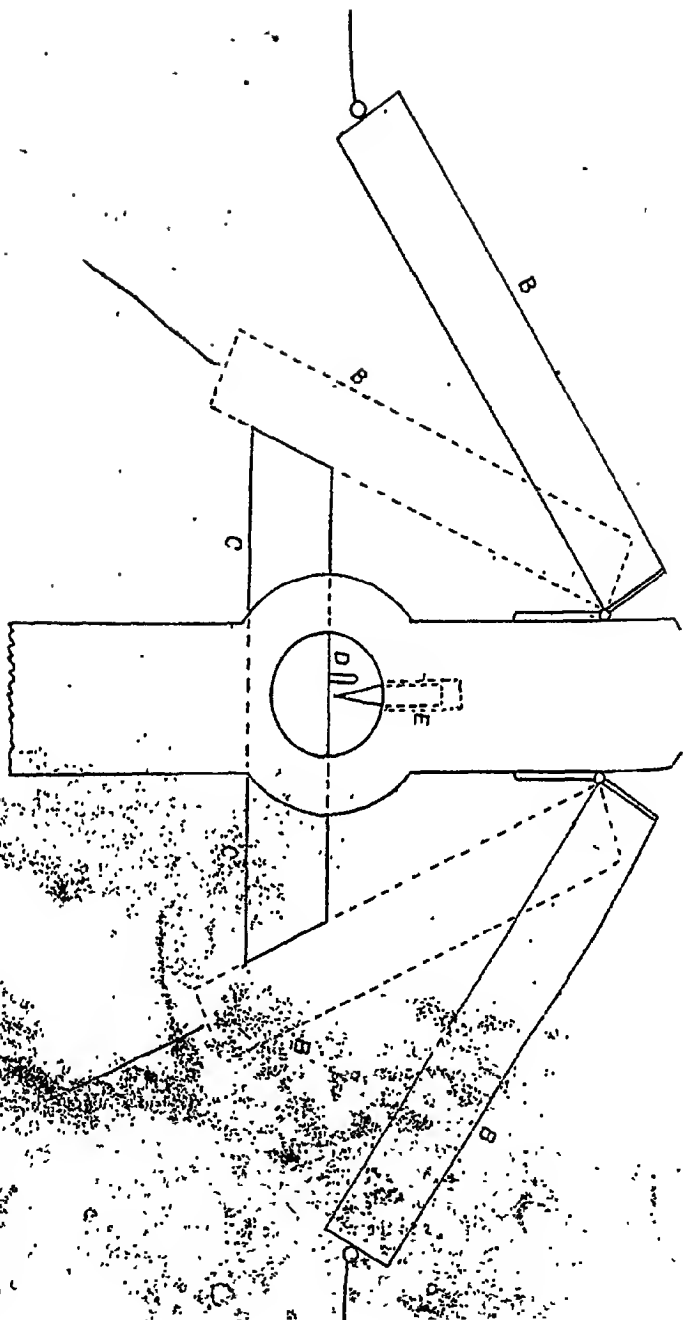
PLATE IV.



Photo-block.

Survey of India Office, Calcutta, 1911.

Cart trotting Bullock.



Rough drawing showing principle of Burmese winnowing post employed in rubber plantations.
 Before the race those interested or otherwise can inspect the instrument which are
 The dotted lines show arms after race. There can be no doubt as to the thread supporting it having been broken in it.

 Buffalo Fights.

Appendix K (a).—CART-RACING (HLE-PYAING PWÈ.)

This is another popular amusement and means of gambling. The great centre for it is the Sittang plain—Kyaikto, etc., but races are held in many districts of Lower Burma. The races are all matches for single or pair bullocks and are run in heats. The tracks are parallel, a few feet apart and the course is straight, varying in length from three to four furlongs. Some of the racing cattle are, besides being fleet of foot, very handsome, well kept animals. The carts are exceedingly light. A cart is easily taken to pieces and can be carried by two men. Some are beautifully ornamented with carving.

A drawing and description of the judging machine is attached. It is frequently a difficult business to start a race; the cattle in one or both carts get excited, become refractory, break away, and often dash a cart to pieces. The drivers in these races must be plucky fellows, as, apart from the shaking, there is a chance of the oxen getting frightened by the crowd, shying, and colliding with another cart, ant heap, or other obstacle. An excited bullock does not appear to mind much what happens, and I have seen drivers take some rare tosses, the marvel being that they were not picked up dead. The Burmans are usually calm folk, but racing fills them with excitement, and the joy of those who have won money is unbounded. They shout, gesticulate, wave their *goun-gouns* (head dresses), perform all manner of antics, and generally make themselves the laughing stock of the crowd. On the right of one track and left of the other opposite the winning post is placed a flag on a long staff visible to all around. The result of a race is announced by the clerk of the course lowering the flag on the losing side.

Appendix K (b).—BUFFALO FIGHTS.

In days gone by buffalo-fighting was a favourite and popular pastime especially in the Tenasserim Division, and particularly so in Tavoy and Mergui districts. At the present time, though the sport appeals to the people as strongly as ever, they cannot of course indulge in it as in former years. In times past buffalo-fights were made the occasion of festival. Crowds flocked to the scene. A large plain was selected, on which was erected numerous booths, platforms, and so on. Needless to say much money changed hands. For some time before the fight the subject would be the engaging topic among the villagers for some miles around. It was customary for a village or a town to select and thoroughly train a buffalo for fighting. Those interested in an animal guarded it day and night in order that rival villagers should not have an opportunity of hearing of its feats and also to prevent any chance of rivals administering doses which might prove injurious. The animal was trained to stand the noise of a crowd, etc., by the sounding of gongs, beating of drums and the use of bamboo clappers. As a rule each village caused songs to be composed in honour of the expected exploits of their favourite, and when going to the arena often brought the village band with them. The riders were carefully selected for their courage.

Superstitions, etc.

and athletic qualities. Towards the appointed time, the fighting animals were brought to a place in the vicinity of the arena.

A match having been arranged, the beasts were conducted into the arena from opposite ends under a huge cloth canopy and of course accompanied by crowds of backers, yelling, dancing, and carrying flags. Each buffalo had a rider, who held on to a cord attached to the nose rope, while two other men, one on each side of the head, led the animal. The two buffaloes having been brought opposite each other, they rushed, butted, and gored until one turned tail. At times the buffaloes would simply keep their heads together till the spectators were weary, while in other cases, notwithstanding encouragement and blows, one or both would refuse the combat and bolt, amidst the jeers, hoots, and derisive laughter of the spectators. Brutal fights rarely occurred, but when they did the animals gored each other freely. These shows were dangerous to riders and often enough to the followers. The spectators did not always have all the fun, as there was the prospect of a buffalo, maddened by pain, suddenly rushing into their midst. Once an animal turns tail, he is unlikely to show fight again. When it was decided that one of the combatants was defeated, the band of the winning party struck up, the backers rushed into the square yelling and dancing, and the victorious buffalo was led off accompanied by a triumphant procession.

Appendix S.—AGE OF CATTLE AS ESTIMATED BY THE BURMANS IS.

Cuts temporary incisors,	middle pair (Ale-thwa),	3 days.
" " "	lateral pair (Du-thwa),	15 days.
" " "	outer laterals (Be-thwa),	15 days.
" " "	corners (Pe-thwa),	30 days.
" permanent incisors,	centrals (Kaung-sike),	2 years.
" " "	the first pair (Lachoung-sike),	2½ years.
" " "	the outer laterals (Chonkehoun-sike),	4 years.
" " "	the corners (Thwa-sona),	5 years.

The corners rise to a level with others at 6.

The Burmans, as a rule, can judge the ages of cattle fairly accurately.

At four years of age oxen are trained to plough, etc.; and are supposed to work till from sixteen to twenty years of age.

Appendix T.—SUPERSTITIONS, ETC.

Burmans, but more especially the Taluings and Karens, are extremely superstitious; very little is done without the advice of an astrologer to fix the fortunate day and hour. There are professional fortune-tellers. Talismans are in great demand and much worn, and witches and wizards generally believed in. Often when going on a journey a bunch of bananas is attached to the front of cart to propitiate the "Nat" or spirit who might injure the traveller or his horses.

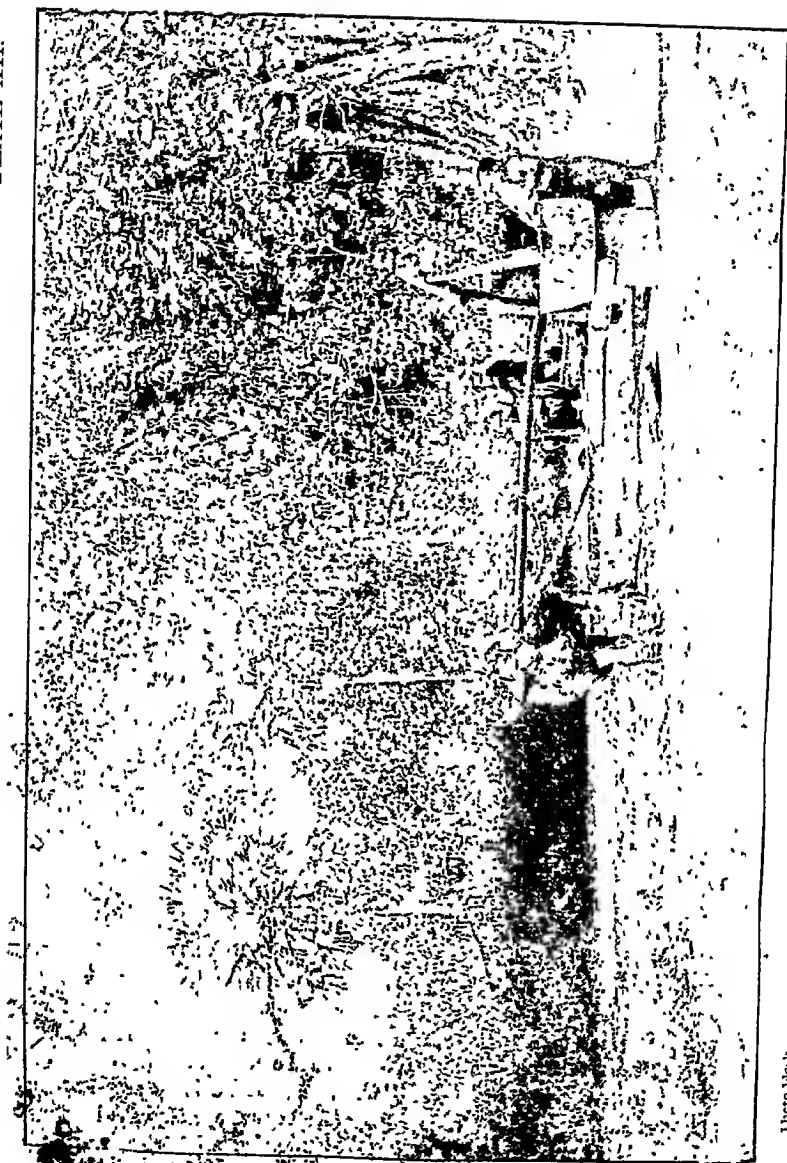


Photo No. 10

Superstitions, etc.

When a man, woman, or animal suddenly becomes ill and is supposed to be bewitched, a witch doctor is promptly sent for. Enquiries are made as to where the patient has last been, and if evil spirits are supposed to reside there offerings are made to propitiate the "Nat" or "Nats" unwittingly offended. In other cases when a doctor fails to effect a cure, he is sure to attribute his failure to the fact that the patient is possessed. A woman very often is then called in. She goes through wonderful dances, incantations, etc., and by degrees pretends to become inspired, when she invites the evil spirit to leave the patient and enter her. These witch doctors pretend to be spiritualists holding communication with spirits.

I well remember when an ox was sick with hoven and some of the villagers pronounced that the illness was due to a "Nat." Several sticks were stuck in the ground around the animal and various articles placed on them, such as a Shan hat, Shan trousers, bags, a pipe, and so on. A female witch doctor (said to be the wife of a "Nat" and I am sure no one envied him) was brought to expel the "Nat," and the process was very amusing. The owner was however not averse to my treating the ox, which recovered, but I feel sure the lady received the full credit for having brought about the desired result. I once saw an elephant having a "Nat" driven out of him. Most interesting information on this subject is given in the works of Drs. Mason and Cullimore to which I have referred.

Burmese Sayas, or Doctors.—There are two schools, both ignorant, and the professors mere charlatans. One school rely on diet solely in the treatment of disease, the other on the exhibition of drugs. Sickness is attributed to many causes, wind, seasons, food, actions in a previous existence, etc., and is treated in accordance with the supposed cause.

In making a diagnosis, the tongue may be examined, but the state of the secreting organs, pulse, temperature, etc., is ignored. No surgical operations are performed. To any form of blood-letting there is the strongest aversion, and even abscesses are not opened. Both schools agree, however, in that the body is made up of four elements. Some of those constituting earth are, hair, teeth, nails, bones, sinews, skin, heart, liver, etc.; in all there are twenty members. Pus, bile, blood, fat, mucus, etc., constitute water—12 in number. Eating, drinking, chewing, licking, etc., constitute the element fire; and wind, of which there are several varieties, constitute the element air. A fifth element (ether) exists though not pronounced, and occupies the ears, nostrils, etc.

The drugs employed in the treatment of men and animals are—leaves, a variety of barks, roots, seeds, various spices, and vegetable food. The inorganic drugs are borax, nitre, green, blue, and white vitriol, sulphur, calomel, sal ammoniac, arsenic, and earth oil. As with all orientals, the larger the dose, the nastier the taste, the more drastic the action of the remedy, the more highly it is esteemed.

For the treatment of certain ailments, such as syphilis and bites from

 Superstitions, etc.

supposed rabid dogs, there are specialists. There are also inoculators for small-pox, and professional shampooers, male and female.

The shampooing fraternity are in great demand in practically every ailment, and certainly in many, massage affords patients great relief. It is invariably prescribed in addition to any other treatment. Animals, too, are subjected to this form of treatment. Some of the drugs employed by Burmans are efficacious enough.

Early writers on Burma have generally remarked on the ravages among stock committed by frequent outbreaks of contagious disease or Murrain. From the Administration Reports of days gone by, much information on the subject may be obtained.

The diseases causing serious losses are rinderpest, foot-and-mouth disease, anthrax, charbon symptomatique and hæmorrhagic septicæmia. As far back as 1836 it is recorded that 12,000 head of buffaloes were swept off in Tonasserim. Within 18 months ending 30th April 1866 it was estimated that not less than 100,000 animals perished. During 1867 the cultivators in Akyab district alone lost 52,441 head. Again, in 1876-77 in Arakan 60,000 animals succumbed to disease. Other notable outbreaks occurred in the seventies and eighties. Since then the most severe outbreaks recorded are as follows:—47,502 animals in 1891-92, and 78,137 animals in 1895-96; (in this year 50,000 of the deaths were recorded in the Akyab district).

Mortality in some parts of this province must always be heavy, particularly in the delta. A great deal depends on the season. For instance, should an outbreak of foot-and-mouth disease occur in the rains, and it then generally assumes an epizootic form, extending over large tracts of country, mortality is heavy, as there are in many parts no dry places for the cattle to stand, etc. Again, often towards the close of the rains, this disease gives great trouble. During the dry season beyond the inconvenience, Burmans do not fear any trouble from this malady. Only those who are acquainted with Burma during the rainy season can form any conception of the difficulties encountered in dealing with contagious maladies. The whole place is a vast swamp. It rains day and night as it must have done during the deluge.

Other conditions tend to render cattle liable to disease. Immediately the rains set in, buffaloes that have been out of work for some time and kept in cool, shady places, with an abundance of forage and water, even that have been away at distant grazing grounds, all more or less fat and out of condition, are suddenly brought in to do hard work at the plough for several hours a day. The fodder that can be picked up at that season is not abundant about the recently waterlogged fields, and shade is not always available. The rains, once established, there is an abundance of rank, rapid-growing, coarse, succulent herbage containing little nourishment which the animals greedily devour and are consequently, suffer from hoven, malignant dysentery, etc. from the sudden change from dry to rank succulent fodder. Though



Photo Drake

Sm. of Ind. & Off. & Cult. B. L.

An aged buffalo with enormous horns, 7' from tip to tip (spread across).

Legend concerning Buffaloes.

efforts are made to protect the animals at night, cattle after much physical exertion are for some hours in the day left to graze, exposed to rain and cold winds.

Buffaloes are more susceptible to rinderpest and hæmorrhagic septicæmia, while cattle are much more susceptible to foot-and-mouth disease than buffaloes.

On the whole, matters are steadily improving. Straw which was regularly burned is now frequently stacked; sheds are often erected near grazing grounds, trees planted, and a little unhusked rice and chopped straw, etc., are occasionally given to supplement the fodder when scarce.

Appendix U.—THE LEGEND CONCERNING BUFFALOES.

The Tamings have a legend attached to their Nat worship, where the slaughter of a buffalo is involved. This may seem strange, as it is contrary to Buddhism, but the worshippers state there is no actual slaughter of the animal—it dies by natural death at the 'Natsin' post, i.e., through the effects of demoniacal possession.

The legend runs as follows:—

Several years ago there was a pond near Kyaikto, where a herd of wild cattle (buffaloes), about 500 in number, used to drink water. A few days old babe of royal blood, illegitimately born, was thrown at night near the pond with intent that it might be trampled upon and killed by wild buffaloes coming to drink. The cast-away, however, was miraculously preserved from death. Nine-ka-rine, the buffalo-queen, nourished him as one of her own calves. The babe grew to be a lad possessing wonderful power and agility, that is to say, he used to play and dance on the tips of the horns of the wild buffaloes. About this period the kingdom of Pagan was being threatened by enemies from outside and a Royal proclamation was issued to the effect that the King would bestow great honors and rewards on any one who would volunteer to fight the enemy. No competent General was to be found, and at last the King remembered about the young buffalo-prince, about whom he had previously been informed by his Moksos (hunters). The King sent for the Prince and offered him the post of Commander-in-Chief of the Royal forces, which he accepted. The young buffalo-prince before attempting to cross the river, which was then in flood and appeared to be very dangerous, prayed if the Nats crossed him over to the other side of the river safe and sound he would offer sacrifices in recognition of their benevolence. His prayer was answered. He won many battles and became famous. The Nats now demanded of the Prince that he must fulfill his promise, at the same time declaring that now a buffalo with exceptionally long horns with gold-tipped tips, would be an acceptable sacrifice. No such suitable cow could be found, so Nine-ka-rine, being her adopted son in a dilemma and fearing that a solemn promise should not be broken, asked that she might be sacrificed and offered to the Nats. As there appeared to be

Return of Live-stock.

no alternative, the Prince was obliged to make her his offering. The head was severed from the body by simply placing a dah upon her neck. Shortly after he became demented, and this was ascribed by physicians as due to the fact of his having sacrificed Nine-ka-rine, the buffalo queen. In order to restore his mental condition he was advised to cause to be cast an exact image of the queen in gold and shikhoed to.

Appendix V.—RETURN OF LIVE-STOCK FOR 1902-03.

	Number.
Bulls and bullocks	1,432,906
Cows	1,162,744
Male buffaloes	356,878
Female buffaloes	359,742
Young stock { Calves	953,280
{ Buffalo calves	367,395
TOTAL	4,662,045

EXPORT OF HIDES, ETC.

The total quantity and value of hides, etc., exported to foreign countries from the province during 1902-03 is as follows:—

	Quantity.	Value.
		Rs.
Hides { Cwt. 57,513 }		1,025,969
{ No. 575,517 }		
Skins { Cwt. 1,198 }		61,235
{ No. 66,850 }		
Horns Cwt. 4,234		73,599
Bones Tons 405		11,618

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